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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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VOL. CLXVI., No. 3182.] WEDNESDAY, MAY 7, 1924. [76TH YEAR.

EDITORIAL NOTES.

The Ways of the Electrical Propagandist.

WE suppose that to those capable of approving the desecration of places of worship by using them for trade propaganda purposes—"a fine stunt" is, we think, the choice phrase of approval used—nothing is "beyond the limit;" but we must confess that until we saw our evening papers last Friday, we did not think that even electrical propagandists were capable of attempting to drag Her Majesty the Queen into the service of their ambitions. We read: "Her Majesty discussed with the cook the advantages of "cooking by electricity over cooking by gas or coal." It is unnecessary for us to state, as we can on very good authority, that no justification existed for such a report; for no one outside the electrical industry, and we believe very few within it, would credit the idea that there could be. It is such-like ill manners and bad sportsmanship that make the title of "a nation of shopkeepers" one of reproach among people of decency and breeding, when it might and should be one of honour. It is, however, not for us to complain. When our competitors have learnt "to play the game," and to act as advocates in business life as we credit them with behaving as individuals in private, they will become far more serious rivals than at present. But, for the honour of British industry as a whole, we ask them to instruct their publicists either to mend their manners while the eyes of the Empire are on Wembley and all connected with it, or to end their activities.

The Budget.

THERE was a distinct feeling of relief throughout the country when the details of the first Labour-Socialist Budget became known, though perhaps it has not given satisfaction to all the supporters of the Government. It has the merits that it imposes no new taxes; it makes no addition to existing taxes; it incorporates imposing concessions in respect of indirect taxation, which will not do a great deal to benefit the individual; and it removes the corporation profits tax, which was highly repugnant to all parties. The Government in this Budget have tried—and fairly effectually, save in one or two respects—to conciliate the members of the other parties, and their motives for doing this are attributed by those who explore for causes to that strong instinct of human nature—self-preservation—and with an eye upon more absolute power as a reward for favours now conferred. Their present moderation is the admiration of all, but not a guarantee for the future. The moderation, however, may on investigation be more spectacular than real. The Government are pleased at the reception of their first fiscal essay; the Labour Party are delighted (if not the extreme end of it) because the Budget supplies them with plenty of material for the platforms in the constituencies; the Liberals rejoice because the national financial scheme could not have been better if produced by themselves; the Unionists are generally in harmony save over the dispatch of the M'Kenna duties, and the flouting of the policy of Imperial preference. The latter points seem to be the only genuine controversial ones. So generally, with the exceptions indicated, the Chancellor of the Exchequer (Mr. Snowden) is complimented; and the Government are happy.

We shall, of course, all benefit to some slight extent from the concessions in respect of indirect taxation. But they will reduce the estimated surplus of £38,074,000, based on last year's taxes, to £4,024,000. We hope the Chancellor's estimates will not go astray, and that the predicted slender margin will in the event expand sufficiently to cover the old-age pension concessions, and the expenditure the Government have in view in respect of housing, unemployment, and other matters. There may be trouble ahead through inadequate provision; but we sincerely hope not. Looking in other directions, there is not much comfort for industry, and very little regard for the problem of unemployment. The abandonment as from June 30 of the corporation profits tax has been hailed with satisfaction. This is one of the surprises of the Budget. It had been felt in some quarters that one of the last things the Government would do would be to relieve themselves of income through consideration for industry; but this particular tax the Labour Party have condemned as having been merely a temporary expedient for obtaining additional revenue, and one that was unfair in its incidence, and an additional obstacle to the development of the trade of the country. It must not be thought that, though so much is heard of communism, nationalization, and so forth, the Labour-Socialist Government are unmindful of the fact that it is through industry and trade that we all live, and that their prosperity is necessary to the maintenance of our national power, credit, and general well-being. Ownership is altogether another question. It is estimated that the removal of the remaining sixpence of the corporations profits tax will mean a loss of revenue of about £2,000,000 in the current financial year and £12,000,000 in a full year. Another slight benefit to industry and commerce will be the concessions in respect of telephone charges, though there would have been more gratification over restoration of the penny letter postage.

Income-tax and super-tax are maintained in their present position, which is another indication that the Government look at things more from the point of view of responsibility than certain members of their party are apt to do when indulging in free speech from the platforms provided in their constituencies or in other public places. The capital levy has been put back into stock awaiting a more appropriate season for placing it in the political window. This being the case, it was thought that the Government might consider that some compensation should be derived by augmenting income-tax and super-tax. But, again, they know their strength; they know the needs of the country, with the facts before them as to trade and unemployment. They are fully aware that improvement is not, at the present juncture, to be facilitated by doing anything which will burden the influx of new capital into the country's industrial and commercial work, and by making enterprise more difficult. For years, however, the income-tax payers have been badly squeezed; and there is some disappointment that this year does not witness a further rebate. As things are, the larger part of the national revenue will now come out of the pockets of the income-tax payers, who are also considerable contributors to the revenue from indirect taxation, and who constitute only one-tenth of the electorate.

Regarding the M'Kenna duties, there will be a decided split over these. What the Government have done in respect of them has been to place party principles superior to national expediency. The industries concerned will be very hard hit; and it is not at all astonishing to find both employers and employed in them united in arms over the threatened abolition on Aug. 1. With unemployment rife, it is a grave step the Government are taking in this particular; for it must mean the transferring of work from

here to other countries. This will affect not only the industries immediately concerned, but those from whom they draw materials and plant. Mr. Snowden excused himself and the Government. They were, he said in presenting the Budget, bound to give effect to the wishes of the electorate at the last election. The protection of the most vulnerable places in our industrial system was not then before the electors; it was a larger question that they were called upon to decide. Moreover, this is a matter which should be looked at not from a party point of view, but as a matter of national expediency.

Coke-Fired Electric Power Stations.

LEADING men in the gas and the electricity supply industries have long advocated the principle of closer co-operation between these two allied public services. It has been felt that, while competition which legitimately tends to improve and cheapen the finished product of either service is, and will continue to be, desirable in the public interest, the time has arrived for co-operation with a view to eliminating wasteful duplication.

Recent experience in firing steam-boilers with gas coke as fuel has shown that co-operation on the generating side is not only possible, but advantageous. Such relationship might indeed have been expected to originate between the gas and electricity departments of one of the great city corporations; but for the most part business relations and experience in coke-firing appear to have been built-up between, and gained by, company-owned undertakings in the Metropolitan area. Statistics of fuel consumption at public electric generating stations, published recently by the Electricity Commissioners, show that, for the purpose, coke is already in considerable demand; but it may not generally be known that, during the past four years, one Metropolitan power station has consumed upwards of 40,000 tons of coke breeze per annum, or close on 50 p.ct. of its total fuel requirements. This has been rendered possible by the introduction of the "sandwich" system of firing coke and coal slack in superimposed layers. Towards the end of the war, this system was adopted by the London County Council Tramways Department at the Greenwich Power Station. The economies effected thereby attracted the notice of the Coal Controller then in office, who invited power engineers to inspect the lay-out at Greenwich. The resulting experience no doubt led to the adoption of the system in the provinces; however that may be, and in spite of the loudly proclaimed advantages of pulverized coal, oil, and colloidal fuels, coke holds its own, on its merits, in the estimation of engineers who have had experience in its use for steam-raising.

This fact is evidenced in a paper read last week before the Institution of Civil Engineers by Mr. S. L. Pearce, C.B.E., Chief Electrical Engineer to the Manchester Corporation. The paper describes the new Corporation power station at Barton, Manchester, whereof the first section consists of 82,000 KW. maximum continuous rating. The steam-boilers installed are each of 100,000 lbs. per hour capacity; but from the viewpoint of all interested in coal-conservation and smoke-prevention, the main feature of the new power station is the provision made in the design and lay-out to facilitate the use of coke as fuel. The coal bunkers, of 3500 tons capacity, are divided longitudinally and transversely to keep apart the different classes of coal and coke—separate coal and coke shoots communicating with each mechanical stoker feed-hopper. The stokers are designed to give the full normal evaporation of 100,000 lbs. per boiler per hour, when using equal parts of coal and coke-breeze; the mixture having a calorific power of 10,000 B.Th.U. per pound. Coal and coke can be fed either separately or together.

These important new features in power-station design, rendered possible by experience previously gained in firing coke by means of mechanical stokers, are, in our opinion, destined to have far-reaching effects not only upon the relationship existing between gas and electricity supply undertakings, but also upon the whole question of coal conservation and the recovery of the chemical and liquid bye-products of coal distillation. Of the latter consideration, the advocates of pulverized fuel do not pretend to take notice; but a fuller recognition of its importance and vital national significance by electricity supply authorities may, it is hoped, lead to a wide extension of the coke-firing features embodied in the Barton power station.

A Miscellany of Gas-Works Topics.

THE paper which Mr. W. W. Atley, of Stockton-on-Tees, read before the North of England Gas Managers' Association last Friday was constructed of a miscellany of problems and experiences drawn from his own operations. They extended from naphthalene stoppages to gas-fire propaganda, with points as to coke recovery and handling interposed; so that there was an abundance of topic on which the members could expatiate in discussion. If there is one thing gas engineers do not care to experience, but are always willing to have information upon, it is naphthalene. Mr. Atley told them of several troubles he has had at Stockton since his appointment, and how he has dealt with them—resulting, we gather from his paper, in a more comfortable feeling than he at first experienced. The trouble was intensified by the fact that the naphthalene had, as it were, become stored in the pipes, and needed a masterly mind to cope with it. There were the inlet and outlet pipes of one of the gas-holders which became obstructed. An application of creosote oil boiled-up with live steam was tried, and improved matters; but there were hard lumps of the substance which it did not touch. Crude benzole, which was cooled down to nearly freezing point to eliminate as much as possible of the naphthalene content, was then used, being steamed up in the same manner as the creosote. This was effective. To prevent further obstructions, a Bryan-Donkin paraffin atomizer is now used continuously at the outlet of the station meter. Some 10 to 12 gallons of paraffin are atomized per million cubic feet of gas; and there is now no trouble on the works.

One related experience shows that it does not always do to attribute the reduced carrying capacity of mains to naphthalene. Passing over an instance of a naphthalene-choked 5-in. main which was dealt with by crude gas oil, we find a question as to the maintenance of supply in a remote part of the area; and with 400 B.Th.U. gas the complaints were justifiable. Experiments convinced Mr. Atley that the trouble was not entirely due to the deposition of naphthalene. The service-pipes in Stockton are of wrought iron; and the author pictures deposits from them in conical form in the mains to which they are attached. Such a deposit from a succession of services would, of course, tend to cause partial, if not total, stoppage of the smaller mains. With 72 miles of mains, the contemplation of such a condition of things is rather disconcerting. But the matter was taken in hand systematically by the author. During the past three summers, gangs of men have been engaged in pumping crude gas oil under pressure down the services of street lamps fixed near the highest points in each road, and in some instances holes were cut in the mains to introduce the oil. This work and the expense have been fully justified, for the number of complaints of short gas supply is now practically *nil*. There is, in analyses given in the paper, corroboration of Mr. Atley's theory that deposits from the services were responsible for the diminution of the carrying capacity of the mains. In an analysis of deposit from a wrought-iron service, one of the items is 49·55 p.ct. of ferric oxide, and another 30 p.ct. of organic matter. After oil-washing the cast-iron main, the deposit from it contained only 2·14 p.ct. of ferric oxide and 85·16 p.ct. of organic matter. This tells a tale. So far as naphthalene is concerned, Mr. Atley is going to defend himself and his consumers by treating the gas (which contains 6 grains of naphthalene) with crude gas oil in a Holmes washer-scrubber.

A little later in the paper, it is seen that the author wants, like many other engineers, an inexpensive method of eliminating cyanogen from gas. Spraying the oxide in the purifiers with gas liquor causes no apparent reduction in the amount of cyanogen in the purified gas. Now he sprays the oxide in the purifiers with clean water; and since the adoption of this process, there has never been more than a faint trace of cyanogen in the purified gas, except on one occasion; and this was attributed to the oxide being in a sour state. The activity of the oxide for H_2S was restored by spraying with gas liquor; but there was an immediate rise in the cyanogen in the purified gas, which was gradually brought down by renewing the spraying with water.

The next section of the paper shows the profit realizable from installing a pan-ash washing plant—the one at Stockton being of the "Robinson" type. The amount of fuel which can be recovered depends to a large extent on the efficiency with which the furnaces are worked. But in the best regulated works—even at the scientifically operated Fuel Research Station—pan-ash washing is found remu-

nerative. A balance-sheet in the paper discloses a recovery of 21 tons 1 cwt. of coke and breeze from 48½ tons of pan ash treated, at an expenditure of £1 15s. 3d., including depreciation and interest on the plant. Reckoning the value of the fuel reclaimed at only 15s. per ton, there is thus a profit of £14 os. 6d. through the treatment of only 48½ tons. This subject leads to another bearing upon coke, and that is its quenching where a telpher is used. Mr. Atley experienced serious delay in this operation. To overcome the difficulty, he has had his telpher strengthened, so as to permit of a skip being used equal to the coke discharged from two retorts; but a *per contra* difficulty is that it takes longer to quench the larger bulk of coke, so that through this the saving of time occupied in transport is largely neutralized. He considers quenching by means of an overhead tank dangerous, owing to horses and carts having to pass under the tank during the process. The fixing of a tier of sloping plates on the tank, and resting on them a 2-in. perforated water-spraying pipe, with a lever for turning-on the water automatically, is one part of the means employed for accelerating the operation; and supplementing it are adjustable spray jets operated by one cock under the control of the telpher driver. The criticism and the remedies are matters which should have the attention of the manufacturers of telpher plant, together with the other related points mentioned in the paper, but not here.

Finally, Mr. Atley describes the great success which has attended the letting on hire of gas-fires in the Stockton area of supply, which last year resulted in a phenomenal increase in the consumption of gas. It will be seen that a satisfactory arrangement for installing the fires has been effected with the local plumbers. Moreover, the fires are maintained free, with the exception of the charge at cost price for radiant replacements. Canvassers were provided by three firms of fire manufacturers, and each was allotted a section of the district. The canvassers are still there; and the firms are content with what is being done. Everything has worked well; and all participating in the campaign are pleased with the results. The number of fires fixed during the year ended March 31 last was 1271; cookers 1536; radiators 109, and wash boilers (from Oct. 16, 1923) 36. The year's increase in consumption on the cubic feet basis was 16·11 p.ct.; or expressed in therms, 22·43 p.ct. This is good testimony; and the experience may set other gas engineers thinking and acting in the same direction.

Those Outlying Communities.

THE distribution of gas has become a matter of prime importance, the weight of which will continue to increase. So much so is this the case that, it seems to us, all medium-sized and large gas undertakings ought to-day to divide the considerable territory in their operations which the term "distribution" is made to cover. Reference was made to this in a paper which Mr. John E. Morfett, of Sunderland, read before the North of England Gas Managers' Association last Friday, and which will be published in next week's issue of the "JOURNAL." Distribution should now be regarded as reaching from the stored gas to the consumers' meters. It is the service-pipes leading to those meters that modern legislation has decreed shall be the location of the minimum pressure at which gas has to be delivered to the consumer. Beyond the meter the work that is done should come under a public-service department in all undertakings organized to meet modern requirements. The work of distribution has really no more to do with the selling of gas and looking after the requirements of the consumers than has the making of gas of the required purity and thermal value. But distribution has become a matter of far more difficulty, imposing heavier obligations, than was the case before the Gas Regulation Act was passed, and before reinforced concrete road-work became imperative through the change in the character of road traffic. These matters, however, were merely mentioned by Mr. Morfett as a prelude to the actual subject of the paper, which was the linking-up of rural areas with high-pressure gas supply.

This is a development which will go on—slowly perhaps, but surely. Gas undertakings, with an eye upon the future, are aware that their new "breathing spaces" are beyond their present limits. It is upon the outskirts of gas-supply areas that building extensions are occurring; and in many places those extensions will in time join up with those from the outlying small communities, which probably are supplied from small gas-works of their own. To be masters of the gas-supply situation before developments begin to any serious extent, is wise in respect of financial and other considerations, included in which is the fact that gas can in these times usually be manufactured, transmitted, and sold with profit to those small communities at prices below those at which the little undertaking can do business. At Sunderland, through the powers given by an Act of 1919, the area of supply was extended; and three villages, each with its own small works, were embraced and linked-up with the Sunderland Works by a high-pressure system, for which two sets of Bryan-Donkin compressors, with Reynolds district governors, and Mannesmann steel tubes (jointed with lead wool) were used. The paper contains much interesting detail which will be useful to engineers engaged in the carrying-out of similar work. Then the advantages to the small communities of a large gas undertaking superseding the small ones is emphatically seen. The three villages connected-up to the Sunderland Works were Whitburn, South Hylton, and Castletown. Before they were absorbed, the aggregate number of consumers in them was 722; the enterprise of the Sunderland Company has given the conveniences of gas to such a number of householders that the total supplied in the villages is now 1552—an increase of upwards of 116 p.ct. The aggregate consumption of gas before the fusion was 9,667,100 c.ft.; this year it is 23,580,000 c.ft.—an increase of nearly 144 p.ct. We have no doubt, too, the communities have benefited largely from a lower price of gas than obtained under the former system of isolated supply. We heartily congratulate the Company, their chief executive officer (Mr. Norman S. Cox), and Mr. Morfett upon what has been accomplished in this respect. The example, we feel certain, will have a beneficial influence elsewhere.

Promoters' Tactics.

THERE are company promoters and promoters. Some are good; the others may be placed in another category. In our time we have had a large amount of experience of the artifices of promoters of a certain type, who have held out promises which have not been fully honoured. A sheaf of prospectuses and the records of the "JOURNAL" tell a tale of Lilliputian gas concerns with broad titles, magnificent capitals on paper, big prospects and dividend promises, and a generosity (also on paper) of interest and redemption terms that disclosed a benevolence which almost passed human understanding. Eventually several of them provided work for the receivers. The gas industry did not continue to be a lucrative field; the electricity industry is now receiving attention. We have from time to time given notice to some of the newer electrical flotations—small things with big names, capitals, dividends, and promises to match, and designed to act seductively among those whose cupidity is greater than their sense. All the characteristics of the prospectuses are similar to the erstwhile gas ones. Even now these promoters remember with so much affection the shareholders of gas undertakings that they send them their inveigling missives and prospectuses. In private capacity, we have had several of these. We know how the Electricity Finance and Distribution Corporation, Ltd., are concerned in them; and that the name of Eaton is identified with that Corporation. But fresh machinery is being constructed.

A week ago the prospectus of the Electric Light and Power Contracts Finance Corporation, Ltd., was received. The newly-hatched "Corporation" proposes to issue 19,000 8 p.ct. preference shares (tax free) of 10s. each at par. The 8 p.ct. for preference shares is attractive. There are also 25,000 8 p.ct. participating short-term guaranted redeemable premium notes of £1 each at par. The "authorized" share capital, by the way, includes 10,000 founders' shares of 1s. each, which will be offered later. Turning to the contracts entered into, we see that the "Electricity Finance and Distribution Corporation, Ltd.," undertake to do certain things if the Contracts Finance Corporation fail at the date of redemption (March 1, 1930). The connection is obvious. It is made more pronounced by other particulars. The Electrical "Consulting Engineers" are the Lighting and Power Finance Corporation, Ltd.; and we recognize the names of certain Directors who are interested in prior flotations. For instance, who with certain gas prospectuses to refer to would not remember the Chairman of the

Electric Light and Power Contracts Finance Corporation, Ltd. The name of Sir C. B. H. Soame, Bart., has figured on several of the Eatonian productions. It is all very interesting, and the history of company promotions suggests to us that there are in the print several indications that caution should be exercised by investors.

The gas industry will no doubt be profoundly grateful to the promoters of the Electric Light and Power Contracts Finance Corporation, Ltd., when it learns that this issue of capital is made for the purpose of enabling the Corporation to undertake and finance sundry electric light, power, gas, and other undertakings that may be offered to the Corporation. We do not anticipate that there will be much offered by the gas industry. But "on such business materializing" —electric, gas, &c.—"the net profits from it should, it is estimated, amply provide for the fixed current dividends on the shares and notes of this issue, with a margin for the note redemption fund" The promoters are optimistic; the material character of their prospects is not so pronounced. However, "the Corporation has the offer of the services of the necessary experienced technical, financial, and administrative staff and advisers, who have had exceptional experience in the organization and development and finance of electric light and gas undertakings, and who are able to offer the Corporation considerable electrical business." Some people may also be delighted to know that "the Corporation is authorized under its corporate powers to enter a wide electrical field, and undertake light and power business, and particularly engage in the establishment, development, finance, underwriting, and construction of electric light and power undertakings." Also "that the Corporation commences operations under favourable circumstances, owing to the fact of being in a position to at once undertake [that is grammatically bad, and it is not the only instance] business on the close of this issue and provision of the capital now offered." Another point which should throw electricity undertakings into ecstasy is that the Corporation have been offered and are proposing to acquire an interest in an important power plant invention for the production of cheap electric light and power. With it the fuel cost of producing electrical energy will not exceed one-tenth of a penny per unit, or one-twelfth of a penny per horse power. The secret of this remarkable invention is revealed. It is due to the bulk of the whole cost of treatment and production of the power being "nearly covered by the selling value of the readily saleable bye-products obtained in the process." It is all very well done—by practised hands. Investors in gas undertakings will prefer something more securely established.

Competent Gas Examiners.

In their own interests and those of their consumers, gas undertakings want men of sufficient competence to be selected to act as gas examiners; but there are in different quarters outside the industry varied opinions as to what constitutes competence for such an office. Certain scientific bodies, at the time the therm inquiry was being held, urged the appointment of super-men—highly qualified chemists and physicists—for the posts. The Gas Referees, with better knowledge of the needs, issued a memorandum in which they gave some practical advice as to the men to whom the work should be assigned. But now we learn, by going as far afield as the "Newcastle Chronicle," that Sir Charles Parsons has headed a deputation to the Board of Trade for the purpose of emphasizing to the President the importance of defining more explicitly the qualifications which are essential in gas examiners. The report of what then took place is mischievously inaccurate. It states that "gas examiners are officials compulsorily engaged by gas companies under the Gas Regulation Act, 1920, to watch over the interests of the consumers; but the clause under which they are appointed is so loosely worded that it is in the power of gas companies to appoint incompetent men." The statement is incorrect. In the case of gas companies, the examiners are appointed by the local authorities, upon whom falls the duty of selecting "competent and impartial" persons. It is true no definition of competence is given in the Act; and so we are told that "the practice of local authorities differs considerably"—this despite the previous statement as to gas companies engaging the examiners. To Sir Charles Parsons is attributed the declaration that "it is only recently he has been made acquainted with the fact that in some places incompetent people are being employed as gas examiners." He, as other members of the deputation, insisted that the examiners should be persons of high professional qualifications and standing. Are the bodies who urged the same thing at the therm inquiry at the back of this fresh movement?

The Reply.

In the absence of the President of the Board, the deputation were received by Mr. Alexander, the Parliamentary Secretary. He told his visitors that the Board were anxious to protect the public, and there should be most careful consideration of the representations that had been made. But beyond this the deputation did not obtain much satisfaction. As Mr. Alexander pointed out, their suggestions would necessitate certain amending statutory powers, and he was not in the position to promise legislation this session, in view of the important and overdue Bills on the stocks. Moreover, in the event of legislation being contemplated, the local authorities would have to be consulted. There the matter rests, and appears likely to do so, with the memorandum of the Gas Referees giving guidance to the appointing local authorities, who do not want to pay for highly scientific men to perform the duties of gas examiners, if other men of less distinction are qualified to carry out the duties imposed by the Gas Regulation Act.

Engagements at Wembley.

Last week on p. 310 we gave a list of the engagements at the British Empire Exhibition in which gas administrators and officials will be interested. It is proposed that the Gas and Fuel Section of the World Power Conference shall meet on July 4 and 7. It is further suggested that the annual meeting of the National Gas Council shall be held on July 8, to enable representatives to attend the meetings of the Gas and Fuel Section of the Power Conference on the dates mentioned above. Definite information regarding these arrangements will shortly be available.

London Traffic Bill.

In the "Journal" for April 2 (p. 23), comment was made upon the effect that the Traffic Road Bill would have upon the road work of gas undertakings in the large area proposed to be included in the measure. That area has in Committee been restricted; but it is hinted that the Government are likely in the House to seek its extension—if not to the original extent, to something which will embrace more territory than now stands in the amended Bill. The National Gas Council find that the number of gas undertakings that were threatened to be affected by the Bill as originally drafted was upwards of forty. Several amendments have, in the interests of those undertakings, been proposed by the Council. This, we anticipated, would occur.

Coal Merchants' Profits.

In view of the dissatisfaction in the mind of Mr. Shinwell, Secretary for Mines, as to the profits made on coal retailed in the Metropolitan area, the Coal Merchants' Federation have sent to him the certificate of the Chartered Accountants, Messrs. D. W. Coats, West, Grimwood, & Co., as to the average net profits for the years 1921-2 and 1922-3. They certify them to be respectively 9·8d. and 9·03d. per ton. In the letter conveying these figures, it is said that the profits can hardly appear to an unprejudiced person to be excessive; and as they are so conclusive it is felt that to reply in detail would be to trespass on the courtesy of Mr. Shinwell. We rather gather that the Secretary of Mines would welcome such trespass, as what he is anxious to find out is how the difference between the price paid for coal at the pit head and the price at which it is retailed to the public is distributed. He will certainly not be satisfied with the certified 9·8d. and 9·03d. as being a sufficient result to his investigations.

Cheap Oxygen.

We have not had any news for some time as to the Jefferies-Norton system of producing oxygen. In "Nature" recently, Prof. Henry Biggs, of the Heriot-Watt College, Edinburgh, was writing on the subject; and in the course of the article, he said: "From the Jefferies-Norton process now operating on a large scale in America, gaseous oxygen and nitrogen are obtained at roughly the same pressure as they are delivered from the air-compressor (20 atmospheres); all the power needed to run the

plant is got by superheating the nitrogen yielded, and making it do the work in an ordinary steam-engine. When the plant is producing at the rate of 4000 c.ft. of oxygen per minute, the gas costs (it is claimed) only 3d. per 1000 c.ft., while when giving 1000 c.ft. per minute the equivalent price is 7½d." In the March issue of "Industrial Gases," it is stated that in view of these statements the trouble was taken to communicate with a thoroughly reliable authority on all matters relating to oxygen in the U.S.A., with the result that the following reply was received: "The Jefferies-Norton process, so far as we know, is a 'dead issue' in this country. There is not a single plant operating under that system, and no Jefferies-Norton plant has ever produced a foot of oxygen. As you know, a helium plant was started by the Government; and after the fruitless expenditure of hundreds of thousands of dollars, with the net result of no helium, even our prodigal administrators gave it up as a bad job, and the plant is now abandoned." This reference may bring direct information from headquarters.

The Coal Inquiry.

The Court of Inquiry have held their final sitting; and the Chairman (Lord Buckmaster) has promised that they will consider the statements and evidence, and publish their findings as soon as possible. The President of the Miners' Federation (Mr. Herbert Smith) says it is the honest intention of the miners' representatives to abide by the decision of the Court. We hope this will be so. But other representatives alleged that the industry is badly and wrongly managed, and urged the need for unification, in order that men who are not well paid should receive extra remuneration from the proceeds of more prosperous districts. There are certain things that have emerged from the evidence that are particularly striking. One is that there are men in the industry who are adequately paid, while others are not; that the proposals of the Miners' Federation in respect of wages would entail a loss of £65,000,000; that although there are men who are inadequately paid, short time is worked by many of them.

Bad Management, or Lower Production?

The industry, it is asserted by members of the Executive of the Miners' Federation, is badly and wrongly managed. But the Federation will not allow it to be managed in a way which would make it more productive to the community, the miners, and the owners. One part of the evidence of Mr. W. A. Lee, the Secretary of the Mining Association, was striking in this regard. He held that it is impossible to take any arbitrary period such as 1914 as a basis, and to require that the industry should pay, as a minimum, real wages equal to the wages in the basic period without having regard to the question whether the industry is now producing the same amount per person employed. The relation between production per person employed immediately before the war and at the present time is brought out by the following figures: In 1913 the average number of persons employed in coal mining was 1,110,000; and the tonnage output was 287·4 millions. During 1923 the average number of persons employed was 1,150,000; and their tonnage output was 279·2 millions. It is evident that the workers in the coal industry could have secured in 1923 real wages equal to those of 1913 only by virtue of a greater increase in the price of coal than in the prices of commodities generally at the expense of other sections of the community. The suggestion that 1914 wages *plus* the percentage increase in the cost of living represented a living wage, implied that in 1914 wages in the coal industry were at the subsistence level. This certainly was not the case. On the contrary, 1913 and the first half of 1914 was a period of prosperity and high wages. If the 1913 rate of output had been maintained in 1923, the rate of earnings per shift would have exceeded that of 1913 by a percentage greater than the percentage increase in the cost of living. The rate of output per person had been falling almost continuously for many years before the war, and the process was accelerated by the reduction of hours in 1919. In this lies one of the main difficulties of the industry to-day.

Prof. Thomson has been awarded, by the Presidents of the eight British Engineering Institutions constituting the Award Committee, the triennial Kelvin Gold Medal for 1923; and formal presentation of the medal to him will take place during the Kelvin Centenary Celebration in July.

THE ROYAL VISIT TO WEMBLEY.

Inspection of the Gas Exhibit.

THEIR Majesties the King and Queen, accompanied by Their Royal Highnesses the Duke and Duchess of York, paid the first of a series of unannounced and informal ("bowler hat") visits to the British Empire Exhibition on Friday last. Before and after luncheon the Royal Party made tours through the Palaces of Engineering and Industry for the purpose of getting a general idea of the principal contents of these enormous buildings, which are so full of interesting and fascinating exhibits that it would take anyone at least a week to examine them with anything approaching thoroughness. The Deputy-Chairman of the Exhibition Board (Lt.-Gen. Sir Travers Clarke) last Thursday intimated to the Chairman of the Gas Exhibit Executive that Their Majesties would pass through the Gas Section in the course of their tour the next day, but that it would be in no sense a State visit to any particular exhibit, and that it was only desired that the person in charge of each should be in attendance to give any explanations or information desired. Accordingly, by arrangement with the Chairman of the General Committee (Mr. D. Milne Watson), the Chairman of the Executive placed himself at the disposal of the Director of United Kingdom Exhibits, Sir Lawrence Weaver (who conducted Their Majesties on their tour through the Palaces which bear such fine evidence of his power of inspiration as well as of his organizing ability), and awaited the Royal Party on their arrival about 3.15 at the side entrance to the Gas Exhibit which leads into the Industrial Section. Sir Lawrence having presented Mr. Goodenough to Their Majesties, the Queen expressed a wish to be shown the Exhibit which, it was explained to Their Majesties, represented the co-operative effort of all the leading, and a great many of the smaller, gas undertakings of all parts of the United Kingdom. (A cheque received that morning from Dublin made it possible to speak without reservation on this point.) Careful arrangements had been made to close temporarily all other entrances to the Exhibit by ropes in charge of responsible officers while the Royal Party were inside, so as to prevent any possible crowding-in of visitors; and the result was most satisfactory.

The first exhibits inspected by Their Majesties were those of sweetmeat-making and pottery-firing. At the latter, the Queen spoke to the artists (Mrs. Shuffery and her daughter) and was shown the interior of the gas-kiln in which pottery was being baked. At the adjoining exhibit a crucible of molten aluminium was being drawn from the furnace, and Their Majesties watched it being poured into moulds, while it was explained to them that aluminium castings were largely used in motor-car, aeroplane, and submarine construction. His Royal Highness the Duke of York remained watching the cutting of metal by oxy-coal-gas flame, while the Queen passed on to inspect the cookery demonstration section, where work was in process, and thence into the Rest Lounge, where Her Majesty and the King immediately evinced much interest in the tableaux representing "The Seven Ages of Woman." Her Majesty suggested to the King that they should inspect the whole series of tableaux in proper order; and accordingly they were conducted first to the nursery, where the gas-cooker and the bath enclosed in cupboards attracted attention and comment. Next in order, the children in the play-room, one of them riding her rocking-horse with smiling enjoyment, greatly amused Their Majesties. The King chatted in a most friendly manner with them and laughed heartily over their unaffected replies to his questions. Passing the schoolgirl in her domestic science classroom, the nurse probationer in her "bachelor" bed-sitting room, and the business woman in her all-gas restaurant kitchen—with a kindly word and smile to each happy, curtseying girl, and interested questions to their conductor as to the purpose of the several sections—Their Majesties paused to speak to the lady who is, as the King laughingly expressed his surprise to find any woman, "brave enough" to admit she is middle-aged. With the kindliest of smiles at the "old lady" in the last section of the "Seven Ages," and a glance at the handsome Consulting Room and Managing Director's Office, with their beautiful fireplaces and gas-fires, Their Majesties completed their tour through, and unexpectedly prolonged inspection of, the Gas Exhibit, taking appreciative note of the fact that it provided a welcome resting place for tired sightseers. They passed out through the Main Entrance Porch with a gracious word of thanks to the Chairman of the Executive, who felt very grateful to all the workers who had by united and almost heroic efforts during the previous 24 hours completed every detail of the internal equipment and decoration that mattered, in time for this first visit to the Exhibition of the King and Queen since its State Opening.

PROPOSED VISIT OF INSPECTION BY THE INDUSTRY.

It may be added that a general invitation is being issued to the industry to attend an official inspection by the General Committee during the morning of Wednesday, May 14, and that a luncheon (for which those attending will pay) is being arranged for that day in the Stadium Restaurant, to be followed by a business meeting in Conference Hall No. 2.

A 35-ton "T.I.C." tar-dehydrating plant supplied by the Woodall-Duckham Company has recently been installed at the works of the Tottenham District Light, Heat, and Power Company.

ELECTRICITY SUPPLY MEMORANDA.

A highly interesting paper for electrical engineers was read at the meeting of the Institution of Civil Engineers last Tuesday. It was by Mr. Henry N. Allott and Mr. S. L. Pearce—the latter being Chief Engineer of the Manchester Corporation Electricity Department. The paper described the first constructed section of the new Barton Power Station, the plant capacity of which is 82,500 kw., which is half that the site will accommodate. For both gas and electrical engineers, a feature of importance is that provision has been made for feeding the boiler furnaces on the "sandwich" system with coal and coke breeze; and the hoppers and shoots have been constructed particularly for this purpose, though coal and coke can be fed either separately or together to the furnaces. The stokers have been designed to give normal evaporation when using equal parts by weight of coal and coke breeze—the mixture having a calorific value, as fired, of 10,000 B.Th.U. per lb. It is a singular thing that among municipalities owning both gas and electricity undertakings, there should not long ago have been utilization of coke or coke breeze as fuel in conjunction with coal for raising the steam required for electricity generation; but it has been left to electricity power stations without administrative association with gas undertakings to prove the economy and the operating value, through the improvement of the fuel beds, of the system of coal and coke firing for steam-raising. And they have proved it thoroughly. So much so that there is no valid excuse for others not doing likewise. We remember to-day with amusement the time when it was thought by some electrical engineers that the use of coke would assail with destruction the tubes of boilers. Nothing untoward has happened. Certain writers in the electrical papers also displayed a painful lack of knowledge by describing coke or breeze with its high carbon content and good calorific value—coke which aids the combustion of the coal—as gas-works "refuse," and reviled it in other unmerited language. Of course, they have been convicted of ignorance as to the changed characteristics of the fuel bed, and the economic advantages realized, by the use of coke or breeze in the manner which is the vogue in several power stations, and now at Barton. Silence to-day reigns where before imagination and nescience condemned. With Barton as an example, in the industrial North and in the Midlands there will no doubt be a large expansion of this collaboration in fuel supply between gas undertakings and electricity generating stations, to their joint advantage, and that of the neighbourhood in which the stations are situated, as well as in respect of coal conservation, which is of national moment.

Coke Fuel at Manchester.

The Co-operative Display.

The co-operative display of the British Electrical Development Association at the British Empire Exhibition has been designed principally to demonstrate what electricity can do in domestic life—not only in respect of lighting, but in cooking, heating, &c. The exhibit is in the Palace of Engineering; and, though not housed in the compact fashion that gas is in the Palace of Industry, it is a display worth inspecting by gas men, if only to view what is the latest on offer by their competitors. Some 250 public supply undertakings have subscribed to the exhibit. We do not know the sum of the contributions, nor how much has been spent on the exhibit; but it is known that the electrical contractors have taken a good part in it. We are not quite sure what the "rendezvous" is intended for. It looks as though it would, deprived of electrical equipment, make an excellent pavilion for a cricket field. If it is merely intended to provide accommodation for electrical men and their ladies to rest and talk, and not for the general public, then in our opinion it would have been better to allocate the money and the space to some effective demonstrating feature. On the other side of the space devoted to the Association's exhibit, there is a range of rooms in which the architects and designers of the decorations have well displayed their respective abilities, save that the former, confined by area boundaries, have not been able to allow sufficient space should the tide of sightseers swell. Perhaps this is an advantage, because it practically ensures that all will secure a front place to inspect the rooms; but we do not like overcrowding in such circumstances. However, we would suggest to the authorities that when electrical engineers meet in that passage-way, they should not stand there discussing matters and blocking it. This was the case when the writer paid a visit, admired the rooms, and was attracted by the pretty pictures through the windows, and almost forgot that the electrical appliances were what he wished to inspect, until progress was stayed by a group of men in conversation who are identified with the generation and sale of electricity. However, this by the way. At the outset we were not particularly charmed by the lighting of the rooms. Perhaps there has since been an alteration; we will take notice next time we visit the place. It would also be advantageous if the attendants could give the public information as to the cost of wiring and installation; the cost of the appliances and apparatus on view; and positive particulars as to electricity consumptions and efficiencies. There is interest, too, on the stands between the rendezvous and the range of rooms. But more another time, after a more leisurely visit.

Selling Light—Not Lamps.

Suggestion has been made on previous occasions that if the idea of selling and purchasing light could supplant that of selling lamps, it would be an excellent thing. In the American electricity industry, the notion is being largely cultivated; and the salesmen are being educated up to it. An article in the "National Electric Light Association Bulletin," by Mr. Roy A. Palmer, on selling good lighting, describes one of the methods adopted to this end. The fundamentals of selling lighting are taught in classes. The salesmen appreciate that there is more in the lighting business than the selling of lamps, and that if they are qualified to design and specify good lighting for a customer, they will largely increase their sales and build up the everlasting goodwill of their customers. To gain the necessary basic principles, they attend a Design School. At the Ninth Illumination Design Course in Cleveland, no fewer than 77 men attended to learn the ways of enlarging their stock of knowledge and competence. The students included men representing central stations, retail dealers, lighting equipment manufacturers, as well as members of the International Lighting Mission. We do not know the objects of the "Mission;" but we imagine it has something to do with the preaching of the gospel of good lighting. The course comprises lectures and demonstrations, covering the theory and principles of lighting. Typical factories, offices, and stores are visited, and lighting lay-outs are designed for them. Theory and practice are thereby joined to give a thorough training to the student. Street lighting, sign lighting, and automobile lighting are also studied and demonstrated. Having obtained a working knowledge of illumination, the student has effective sales ammunition at his command. Lectures embracing merchandizing principles, advertising, and selling are given, which instruct the student how to use the sales ammunition which he has acquired. Contracts, sales rules, surveys of the various markets, and the methods of developing them are discussed in lectures with a view to aiding every man to expand business in his particular field. Newly completed demonstration rooms at Nela Park were used for the first time by this school. Containing the whole lighting story in a nutshell, the demonstrations in the rooms help those attending the course to visualize the facts and principles brought out in the lectures, in a way that could not otherwise be accomplished. A class room is equipped with special demonstration lighting fixtures, a stage for demonstration purposes, and demonstration booths along the sides of the room to show the most up-to-date lighting equipment. Individual rooms containing equipment for demonstration of industrial lighting, home lighting, street lighting, automobile lighting, show-window lighting, and sign lighting enable the visitors to obtain in a short time a most comprehensive idea of modern methods, and the benefits from good lighting as contrasted with bad. Mr. Palmer says it is sometimes quite difficult to picture the immense possibilities of light as applied in the various fields; and these demonstration rooms serve admirably to span the gap between imagination and realization. The idea is an excellent one. Not all gas salesmen have yet learned the principles which are fundamental to good lighting.

Expert Service and the Cooker.

In the development of the cooking load in the electricity industry, it has become recognized that prompt and competent service is very necessary to supply undertakings, if anything goes wrong. This is not surprising; for the cooking apparatus which possesses the maximum complication and the greatest number of points for potential trouble is the electric cooker. It requires expert attention when anything goes wrong; for the amateur may do a good deal of additional mischief by attempting to set things right. The importance of service by the electricity supply undertakings is recognized by the editor of the Commercial Development Section of the "Electrical Times." Referring to the Salesmanship Conferences of the past session, he says: "An important majority of opinion which has emerged from the later discussions is to the effect that if cooking and other domestic apparatus is to be installed in houses on an extensive scale, it will have to be done by the supply undertakings who must be prepared to give service in the true sense of the word." He mentions that at Norwich the supply authority has a staff of men who, at a moment's notice almost, are on the spot to attend to anything which goes wrong; and the same service has been adopted at Maidstone and Hackney. He admits that the idea of such service did not originate with the electrical industry; but "many insist that it is the thing which has done more than anything else to put the gas industry in its strong position." May be it has helped to that highly desirable condition; but the fact is we wish most devoutly that more gas undertakings would realize the importance of good service by them in the houses of their customers. There are two things which will put more energy into gas undertakings that have hitherto passed-by the policy of good service. One is the loss of business to electricity through lethargy; and the knowledge that the electricity undertakings are beginning to practice that which they have ignored. The gas industry can offer more B.Th.U. for a given price; and it has highly efficient apparatus at command. Yet some gas undertakings spoil the advantages they have by neglecting to ascertain whether the users are getting the best service from the appliances and the thermal energy. The foolishness of this will dawn upon them when their competitors prove to them the efficacy of that which they neglect.

The Unproved Assertion.

It is almost pathetic to see how some electrical men try hard to convince the public that their purses will benefit by using electricity for heating purposes compared with other heating agents. It is a big task. People who practise this piece of self-deception, and try to influence others to the same belief, are no better than those who essay the task of getting a quart of water into a pint pot. There are no more than 3420 B.Th.U. in a KW.-hour; there is no electrical appliance that returns in useful work 100 p.ct. efficiency; and cooking operations are done at a much lower efficiency than that, especially on the hotplate. The "Electrician" states that in most residential districts ample facilities are now available, in the way of both current and equipment supplies, for the employment of electricity for cooking and heating; further, that while in many minds there has prevailed an idea that the cost is prohibitive, "it is now being realized that not only is the current actually cheaper than gas, but that it is incomparably cleaner and more efficient in all respects." We are exceedingly doubtful regarding the realization that current for cooking and heating purposes is actually cheaper than gas, and that it is cleaner and more efficient in all respects. We should be pleased if our contemporary would go into the matter in detail. Inflated talk, electrically specialized, does little good. Electricity is not cheaper unless it can do the same amount of work as gas for less money; and we challenge the "Electrician" to prove that it can—in respect of either heating, or all those things that are done on a gas-cooker; or in respect of water heating. There can be proof by the arithmetical process, combined with the known heating values and efficiencies of the two agents, and by demonstrations in cost for equal work.

A Bad Year.

The British Electrical Transformer Company are makers not only of the plant indicated by their title, but of "Tricity" cooking apparatus. The Chairman of the Company (Mr. A. F. Berry) had the mournful tidings for the shareholders, at their recent meeting, that the gross profit on the trading had dropped by upwards of £44,000. This heavy fall he attributed to slackness of trade generally, and the very low prices ruling for products invoiced during the period. The loss on the twelve months' trading amounted to £22,129, which had to be increased by £4000 to provide for depreciation of plant, &c. Fortunately the Company have a strong reserve; and there will still be £44,419 left in it after transferring £17,992 to balance profit and loss. The Board recommended that the question of the payment of the cumulative preference dividend should be further postponed until the balance-sheet for 1924 is complete. The seriousness of the position is shown by the fact that the accounts for the past three years show a fall of gross trading profit from £132,577 to £54,406 in 1922, and to £10,077 in the year under review. Mr. Berry endeavoured to administer a little comfort to the shareholders by stating that there is decided evidence of improvement in the present year. But was not Mr. Berry at one time so optimistic of "Tricity" cooking and other appliances as to believe that they would be irresistible among householders? Had that been true, what a fine dividend the Company would have been able to pay!

What is an Extension?

There has been controversy between the Ealing Corporation and the Electricity Commissioners, which resulted in legal proceedings and has established the jurisdiction of the Commissioners on a firmer basis than ever. The ferment began when the Ealing Corporation desired sanction to take electricity in bulk from the Hammersmith Borough Council, which proposal did not fit-in with the reorganization plans of the Commissioners; and therefore they refused permission. Then the Corporation became a little peevish, and decided to make an addition to their generating station without enlarging the station buildings. They held that this did not constitute an extension of the station within the meaning of the Act; but the Commissioners disagreed with them. The latter have a determining voice in the matter of extensions; and in their view extensions are not confined to site and buildings. Plant is also covered by the term. The case was argued before Mr. Justice Romer, who was wholly in accord with the Commissioners; his Lordship holding that in settling schemes for the improvement of the existing organization, an important consideration must obviously be the capacity of the existing generating station—the size of site and buildings being of relative unimportance. Therefore, in his opinion, the Commissioners have power to veto an extension in both the size and capacity of a station. That is one declaration; another is that the payment of the cost of a turbo-alternator—£20,000—out of income cannot be justified. Naturally, there must be co-operation with the Electricity Commissioners if there is to be a successful issue from their reorganization and co-ordination plans. These are far from being perfected; and a successful issue seems to be effectually blocked by malcontents and passive resisters.

It is announced from Washington that Messrs. C. O. Fairchild and M. F. Peters, of the United States Bureau of Standards, have succeeded in fusing thorium oxide at a temperature of 6400° Fahr.

PERSONAL.

The Ellesmere Port Urban District Council have appointed Mr. CHRISTOPHER BREAKS, of Mossley, as Gas Manager, at a salary of £350 per annum.

Mr. THOS. VICKERS, late of the British Cast-Iron Research Association, has commenced in private practice as a Foundry Consulting Engineer. His offices are at No. 14, New Street, Birmingham.

Following upon the appointment last month of a Public Lighting Engineer for Sheffield, the Corporation of Oldham has now appointed a Public Lighting Superintendent, the officer being Mr. ISAAC H. MASSEY, Distribution Superintendent of the Oldham Corporation Gas-Works. Mr. Massey has had a long experience at Oldham, and in his future connection with its public lighting will deal with both gas and electricity. He is a member of the Institution of Public Lighting Engineers and Superintendents, being one of the founders.

OBITUARY.

The death occurred on the 2nd inst., of Mr. KENNETH PHIPSON HAWKSLEY, a member of Council of the Institution of Civil Engineers. Deceased, who was 54 years of age, was a son of the late Mr. Charles Hawksley.

AN ALTRUISTIC ACT.

Or was it an Appropriate Printer's Error?

During the past two weeks, a Heat, Light, and Power Exhibition has been running in Hanley. The premises where the exhibition was held were divided into two sections—one half for gas; the other for electricity. The Electricity Department had some invitation cards printed, as follows:

County Borough of Stoke-on-Trent
ELECTRICITY DEPARTMENT.
Heat, Light & Power
EXHIBITION
PALAIS DE DANSE, HANLEY,
Thursday, April 24th, to Saturday, May 3rd, 1924.

BAND OF H.M. WELSH GUARDS.

This ticket admits one person. Open 2 to 10 p.m. Daily.
Valid for One Admission.

[P.T.O.

The "P.T.O." was extraordinarily kind; for when the recipient turned over, he or she read:

USE GAS
FOR PERFECT COOKING.
DEMONSTRATIONS DAILY
in the GAS DEPARTMENT'S
LECTURE HALL
By Miss H. H. TUXFORD, M.C.A.,
Gold Medallist, Diplomée Board of Education, &c.
USING MODERN GAS COOKERY EQUIPMENT.

"Use gas for perfect cooking!" The invitation card being issued by the Electricity Department, the recipient would know that the advice as to using gas for perfect cooking was absolutely disinterested. It could not be otherwise. Such absolute truthfulness by any of our electrical friends deserves really prominent recognition. It shows that there are among the electrical men some who are not so bad as they have been represented, and who are not so well acquainted with the science of inexactitude as some of their professional contemporaries. After saying this, it is sincerely hoped we shall not be told that the printing of the advice as to using gas for perfect cooking was due to a printer's error. That would indeed reduce the dimensions of the kindly feelings we have towards the Stoke-on-Trent electrical people. Error or not, we have not the slightest doubt that the card has been very advantageous to the Gas Department.

Further Woodall-Duckham Retorts for Portsea Island.—The Woodall-Duckham Vertical Retort Company have received an order for a second installation of "W-D" vertical retorts at the Hilsea Gas-Works of the Portsea Island Gas Light Company, making the third installation erected for that Company. The new plant will have a carbonizing capacity of 147 tons of coal a day.

London and Southern District Junior Gas Association.—The annual general business meeting of the Association will be held at the Westminster Technical Institute next Friday, at 7 30, when office-bearers will be elected and the President will report upon the work of the session. Saturday, June 14, is to be ladies' day, and will be devoted to a visit to the works of the Reading Gas Company.

BRITISH EMPIRE EXHIBITION NOTES.

A week has passed since the first account of the British Empire Exhibition appeared in the columns of the "Journal," and even during this short period much work has been done and great progress made in the presentation of the exhibits in the Exhibition generally, and in the Palaces of Engineering and Industry in particular. The sound of hammering is diminishing, and the debris and seeming chaos of a few weeks ago have at last given place to orderliness and polish.

The Gas Exhibit.

On the opening day the Gas Exhibit was practically completed, and was certainly far more advanced than most of the other exhibits either in the Palace of Industry or in the Palace of Engineering. Now the last speck of dust has been swept away, and the public and the Organizing Committee can find the utmost satisfaction in viewing the culmination of a truly admirable endeavour. That the efforts of the workers, and the potentialities of the gas industry are appreciated has been amply demonstrated by the crowds of people who have visited the Gas Section of the Palace of Industry. It is only necessary to listen to the remarks passed by admiring visitors to realize what a revelation the gas display is to the general public. The restful beauty of the lighting, the efficiency and harmony of the heating appliances, the cleanliness and speed of cooking, the manufacture of charming pieces of pottery—to say nothing of the many demonstrations of the use of gas in industry—are making a vivid and lasting impression on all who visit the British Empire Exhibition. Not only are they discovering, in many cases for the first time, what an important part town gas plays in present-day life, but, thanks to the courtesy and attention of the exhibitors, they are gaining a knowledge of what is meant by "gas service." It is difficult, in view of the general interest shown, to say that any one section has aroused particular attention. Industrialists from all countries are certainly intrigued by the way in which the exhaust gases from a 20 B.H.P. gas engine are made to perform a useful function by passing through a waste-heat vertical boiler, and in some cases are astonished by the economy which results from the generation of electricity by means of a town-gas engine; but equal interest is shown in other sections. The wisdom of the Executive Committee in providing movement has been proved over and over again during the few days which have elapsed since the day of opening. At every demonstration—whether of the manufacture of aluminium goods, or of the baking of fancy cakes—the Demonstration Hall is filled with interested spectators. At the cookery lectures it is possible to see the look of determination gather on the faces of housewives who have made up their minds that when they return to their own ranges they will emulate the cookery expert. In concluding this paragraph, it may be mentioned that inquiries from all over the world have been made.

The "E.D.A." All Electric Bungalow.

It would not be a difficult matter to pierce the armour-plate of this exhibit with the shell of economy; but warfare of this nature is alien to the aim of these notes, and we will content ourselves with a description of the all-electric scheme of the Electrical Development Association. The bungalow consists of a bedroom, bathroom, reception lounge, kitchen, and wash-house; all the rooms being adjacent and opening on to a narrow avenue, which at once reminds one of the structures erected by the London County Council for regulating the electric tram traffic. The bedroom is replete with many small fittings screwed on to the furniture, and connected to plugs on the skirting of the room, in this way enabling the occupant of the bungalow to change the position of the furniture at will. One of these small fittings is a night-light which, we understand, has a consumption of 5 watts per hour, another consists of an electric heater for curling-irons, so that madame can acquire beauty with the minimum of inconvenience. Two other applications are of interest. One is an electric water-bottle, the other a "self-lighting" cupboard—the opening of the cupboard door switching on an electric lamp.

The bathroom's chief feature is an electric "calorifier," which is equivalent—in aim, at any rate—to the gas-geyser; and it is stated that a hot bath can be obtained in twenty minutes by its use. There is an electric vapour-heated clothes drier and a towel rail; and to complete the bathroom equipment there is a shaving-water heater with which it is possible with the expenditure of 1 unit to heat sufficient water for fifty shaves. As for the lighting, the main illumination is derived from a central ceiling fitting which gives a diffused light, and there are two local lighting units suitably placed for shaving purposes, &c.

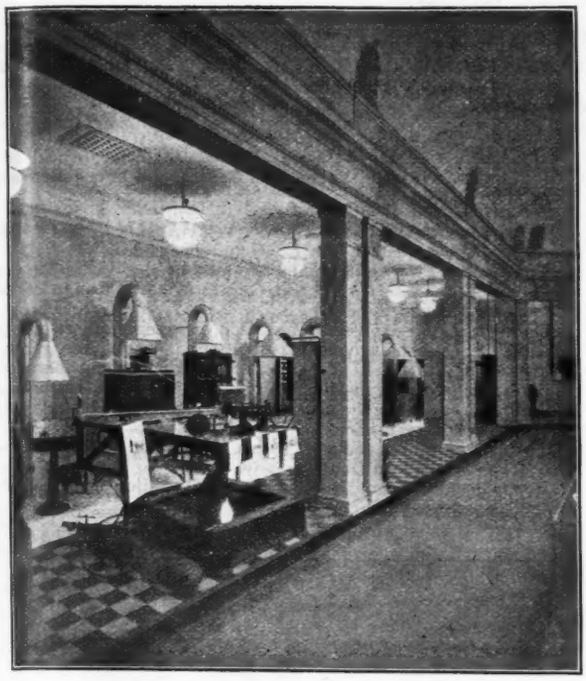
The lounge contains many small electric devices, such as a cigar lighter, electric kettle, toast-rack, and plate-warmer. The room is heated by a fire designed to imitate a coal fire. [There is a similarity in appearance, but marked contrast in heating effect.] In addition, there is an electrically-heated footstool and a four-panel screen. The lighting fittings are of interest, for they enable the illumination to be direct or indirect. This, of course, means dual switch gear. An illuminated flower vase is also exhibited.

The wash-house contains an electric wash-boiler—we do not know the current consumption of this apparatus, but it must be considerable—a washing and mangling machine, and examples of electric irons. Finally there is the kitchen, in which are shown a vacuum cleaner, a water boiler for general household supply, and a cooker. With the latter apparatus it is possible to obtain three heats on the hotplate. What a contrast this is with the flexibility of a gas-cooker! The lighting system of the kitchen is good in that it demonstrates the correct disposition of the units to obviate disturbing shadows. In every case opal globes are used, which must necessarily reduce the efficiency of the light and thus increase the cost.

An Excellent Display of Gas-Works Plant.

As a firm whose sound engineering and attention to detail have earned for their products a world-wide reputation for efficiency and long life, Messrs. Robert Dempster & Sons, Ltd., of Elland, have an exhibit of great interest. On the stand of this firm there is a complete working model of a skip hoist automatic weigher and aerial ropeway. Prominence is given to a monorail telpher bogie fitted with noiseless travelling wheels which eliminate the

A POTTERY DEMONSTRATION IN PROGRESS. [*Photo, by Campbell Gray.*



[*Photo. by Campbell Gray.*

In the Industrial Section.

customary irritating grinding sound noticeable when corners are being negotiated. Two types of rollers for belt conveyors are demonstrated, one being suitable for a belt of medium width, the other being specially designed for wide belts. Among other interesting exhibits, mention may be made of the "Elland" axle-less carriage for spiral guided gasholders, a gravity-bucket conveyor, and two types of electric telpher—one fitted with motors for lift and travel, the other being of the push-travel type, having a lifting capacity of one ton. This brief description is in itself wholly insufficient; but if it indicates that the stand is well worthy of the attention of gas engineers from all parts of the Empire, it will serve a useful purpose.

CONTROL OF STEAM TEMPERATURE.

In describing the exhibits in the Palace of Engineering in last week's "JOURNAL," a brief description of the stand of the British Arca Regulators, Ltd., was given. This firm now have their exhibit complete, and demonstrate an application of the "Arca" regulator of special interest to steam users. This is the control of steam temperatures where mixing superheated and saturated steam, or where de-superheating, is necessary. In the latter case, the regulator is made to control a number of valves which, if the temperature of the steam rises above a fixed maximum, spray water into a de-superheater chamber, which reduces the temperature to the required point. Immediately this is effected, the valves are closed. The regulation is remarkably fine, for we are informed that, whatever the amount of steam passing, control is possible within 1° Fahr.

NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN.

Report of the Chairman for the Year 1923.

The following is the report for 1923 of Lieut.-Col. Kenelm Edgcumbe, the Chairman of the National Illumination Committee of Great Britain, which was presented at a meeting of the Committee on Feb. 5 last.

It was with deep regret that the Committee learned of the death of M. J. Violle, on Sept. 12, 1923. His work on the platinum standard of light, and his association with the French National Committee on Illumination as its Honorary President, cause his loss to be deplored by members of the British National Committee, in common with the whole of the scientific world.

In view of the large amount of standardization which appeared likely to require attention in the near future, the British National Committee, with the approval of the constituent Societies, suggested to the British Engineering Standards Association the formation of a Sectional Committee on Illumination, to which such matters could be referred. The Association expressed themselves as favourably disposed towards the proposal, but desired, before arriving at a decision, to summon a conference of representatives from various organizations likely to be interested.

At this conference, to which delegates representing some twenty different bodies were invited, a resolution was passed unanimously requesting the British Engineering Standards Association to form such a Committee. In response to this request, the Association have signified their intention of establishing a Sectional Committee on Illumination, of which the National Illumination Committee of Great Britain will form the nucleus. Col. K. Edgcumbe has been appointed Chairman, and the exact composition of the Committee is now under consideration.

It is hoped that the formation of this Committee, by bringing together the technical and industrial interests, will not only accelerate standardization in illumination matters in this country, but will enable the representatives of the British National Illumination Committee, when attending meetings of the International Commission, to speak with an authority which has not in the past been possible, representing, as they do, the purely technical side of the industry.

The Sub-Committee on Headlights have pursued their investigations during the year in carrying out the proposed comparison between the recommendations of various countries. The Committee at once experienced a difficulty, owing to the very different bases of comparison which have been adopted. For example, the American requirements are based upon candle power, whereas the British are throughout expressed in terms of the visibility of the "standard disc." It was necessary, therefore, before any progress could be made, to establish a relationship between the visibility of the disc at different distances and the illumination necessary to produce that visibility. With the assistance of the National Physical Laboratory this relationship has been established with moderate certainty, so that it is now for the first time possible to compare the British and American proposals on a common basis.

Another difficulty lay in obtaining a headlight which, even when fitted with American moulded front glasses, would give a beam complying with the American specification. Thanks to the good offices of Dr. Clayton Sharpe, the Chairman of the National Illumination Committee of the United States, this difficulty has been surmounted, and the Headlights Sub-Committee hope shortly to be in a position to obtain a comparison between headlights constructed in accordance with each proposal, from the point of view both of freedom from glare and of efficiency as driving lights.

A number of meetings of the Definitions and Symbols Sub-Committee have been held during the year. As a result, some modifications in the definitions issued in the 1921 report are under consideration by the National Committee, and it is hoped that the British delegates to the next meeting of the International Commission will be in a position to put forward certain concrete proposals for consideration.

At the meeting of the International Illumination Commission held in Paris in 1921, it was provisionally decided that the next meeting of the Commission should be held in the United States in 1924. In view, however, of present conditions, it seemed to the Executive Committee of the Commission that it would be difficult to ensure a really representative attendance of delegates at so great a distance. Accordingly, the members of the United States Committee, while courteously expressing their regret that they would thereby be prevented from welcoming the delegates to the United States, at once acquiesced in the proposal that the next meeting of the Commission should be held in Switzerland. This will accordingly take place in Geneva, from the 21st to the 25th of July, 1924.

The National Illumination Committee of Great Britain (affiliated to the International Commission on Illumination) are constituted by the co-operation of the Illuminating Engineering Society, the Institution of Electrical Engineers, the Institution of Gas Engineers, and the National Physical Laboratory.

The following are the representatives nominated to serve on the Committee for 1924: H. Buckley, W. J. A. Butterfield, J. G. Clark, W. C. Clinton, Harold G. Colman, Kenelm Edgcumbe, Leon Gaster, Percy Good, F. W. Goodenough, Haydn T. Harrison, James Kerr, J. T. MacGregor-Morris, Clifford C. Paterson, Sir Joseph E. Petavel, A. P. Trotter, J. W. T. Walsh, Robert Watson.

The Committee have made the following appointments:

Representatives of Great Britain on the Executive Committee of the International Commission on Illumination.—Messrs. Leon Gaster and Robert Watson.

OFFICERS.

Chairman.—Lt.-Col. Kenelm Edgcumbe.
Vice-Chairman.—Messrs. C. C. Paterson and Robert Watson.
Treasurer.—Mr. W. J. A. Butterfield, 66, Victoria Street, S.W. 1.
Secretary.—Mr. H. Buckley, National Physical Laboratory, Teddington, Middlesex.

James Forrest Lecture.—The Council of the Institution of Civil Engineers announce that Prof. Elihu Thomson, of Massachusetts, has accepted an invitation to deliver the 30th James Forrest Lecture during a visit to this country; and accordingly the lecture, which was originally fixed for May 6, has been postponed until Tuesday, July 8.

THE GAS INSTITUTE OF NEW ZEALAND.

Inauguration Meeting.

A Meeting of the Engineers and Managers of Gas-Works in New Zealand, convened by Mr. G. D. Stone, of Wanganui, was held at the Wellington Gas Company's Office on Feb. 26, for the purpose of forming a Gas Institute of New Zealand.

There was a large attendance of representatives from municipal and company gas undertakings in all parts of the Dominion, and an association called the Gas Institute of New Zealand was formed, with an original membership of forty. The objects of the Institute are "to promote the advancement of the gas, coke, and other coal-products industries in all or any of their branches; particularly to enable persons who are, or have been, engaged in the conduct of any undertaking in these industries to meet and to correspond; to facilitate the interchange of ideas respecting improved methods of administration in such undertakings, improvements in the manufacture and distribution of gas, improvements in the application of gas to lighting, heating, production of power and other purposes, improvements in the construction of gas-works and gas-appliances; to conduct or promote investigations into all or any of the matters connected therewith; and generally to aid, promote, and encourage the acquisition and diffusion of knowledge concerning the production, application, and distribution of gas, the conduct of gas, coke, and other coal-products undertakings, and all related matters."

Office-bearers were elected as follows:

President.—Mr. James Lowe, M.Inst.C.E. (Auckland).

Vice-President.—Mr. G. D. Stone, M.Inst.G.E. (Wanganui).

Hon. Secretary.—Mr. H. Rands, M.A., B Sc., c/o Gas-Works, Miramar, Wellington.

Treasurer.—Mr. M. J. Kennedy (Wellington).

Auditor.—Mr. A. Morrie Taylor (Wellington).

Members of Council.—Messrs. H. W. Atkinson (Auckland), G. W. Healey (Palmerston North), and James Kennedy (Greymouth).

A paper entitled "Water Gas Plant at Auckland, N.Z." [see *ante*, p. 228] was read by Mr. Lowe and discussed.

The members were entertained at lunch by the Wellington Gas Company, Ltd.—Mr. Gerald FitzGerald (Vice-Chairman of the Company) being in the chair.

On the morning of Wednesday, Feb. 27, the members met to consider a draft of proposed regulations affecting the gas industry which the Board of Trade have had under consideration. They appointed a deputation to interview the Minister and the Board of Trade, with the object of securing certain amendments in the proposed regulations.

The afternoon was occupied with a visit to the works at Miramar of the Wellington Gas Company.

It was decided to hold the next annual meeting in Auckland, in the second week in February, 1925.

MEMBERS OF THE GAS INSTITUTE OF NEW ZEALAND (Incorporated).

At the Inaugural Meeting held at Wellington (N.Z.), on Feb. 26 and 27, 1924.

Front Row (*sitting*), *left to right:* James Kennedy, Greymouth (*Member of Council*); M. J. Kennedy, Wellington (*Treasurer*); G. D. Stone, Wanganui (*Vice-President*); James Lowe, Auckland (*President*); H. Rands, Wellington (*Secretary*); A. Morrie Taylor, Wellington (*Auditor*); H. W. Atkinson (*Member of Council*); G. W. Healey, Palm North (*Member of Council*).

Second Row (*standing on ground*), *left to right:* W. A. Courtis, Timaru; H. Appleyard, Petone; W. McCormack, Woodville; R. C. Scoular, Wanganui; A. H. Atkinson, Blenheim; G. Heinz, Hokitika; H. Whincop, Greytown; G. J. Marriott, Dargaville.

Back Row (*standing on form*), *left to right:* John T. Ramsden, Wellington; James Learmouth, Waihi; J. H. Grenfell, Oamaru; Wm. McAuliffe, Lyttelton; J. W. Blackman, Masterton; A. M. Bevan, Westport; C. E. Shaw, Levin; George Davis, Dannevirke; James Bradley, Westport.

"Cascade" Coke Screens.

In the patent "Cascade" coke screens of Messrs. Drakes, Limited, Halifax, the long oscillating shoots are provided with lines of up-tilted fingers or claws, set with constantly widening space from top to bottom. These are self-clearing and non-chokable. Many installations of "Cascade" screens have been put in during recent years, and it is claimed that the grading of the coke by this method is perfect, and the speed very great. No piece of coke goes forward "carrying anything on its back." It is continuously rotated, rolled over, and revolved, so that it is entirely free of all smaller pieces and deposits by the time it reaches its appointed bin or receptacle. Messrs. Drakes are now introducing a further development in which the finger plates will be adjustable by a simple arrangement, so as to allow of every single step or grid being set or altered to any size of screen opening, within limits.

Books Received.—We are indebted to the publishers, Messrs. Ernest Benn, Ltd., No. 8, Bouverie Street, E.C. 4, for the following book: "Fuel" (Resources of the Empire Series), edited by C. W. Andrew, M.Sc., F.I.C., price 21s. net. We have also received a copy of "The Door to the World Markets"—an international year book, in English, French, and Spanish, of the trading conditions and possibilities of world markets, with particulars of the Trade Press. The latter book is published by World Markets, Ltd., at St. Mary's Chambers, Nos. 161A-166, Strand, W.C. 2.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

Annual Meeting at Newcastle-on-Tyne.

THE Annual General Meeting of the North of England Gas Managers' Association was held last Friday at the offices of the Newcastle-on-Tyne and Gateshead Gas Company, Grainger Street, Newcastle-on-Tyne. Mr. J. KELLY, of Bridlington, was in the chair.

Letters of apology for absence were received from Mr. W. Doig Gibb, Mr. J. E. Blundell, Mr. H. E. Bloor, Mr. Charles Wood, and Presidents and Secretaries of kindred associations.

THE BALANCE-SHEET.

Mr. NORMAN S. COX, Hon. Secretary and Treasurer, presented the financial statement for the past year, showing that the balance of income over expenditure was £32. There were 101 members, or 8 less than in the previous year; and 67 associates—or one less. The total income was £100, as compared with £104 in the preceding year; while the actual expenditure on carrying on the Association was £68, as compared with £86 in the previous year, thus making a considerable saving.

On the proposal of the PRESIDENT, the accounts were confirmed.

The PRESIDENT moved that a donation of £10 10s. be made to the Benevolent Fund of the Institution of Gas Engineers. It had, he said, been customary for some years to make this donation, and he thought all the members were satisfied that it was a proper and good thing to do. He was afraid the fund was not as well supported as it might be.

Mr. HERBERT LEES seconded the motion, which was agreed to.

NEW MEMBERS.

The following nominations for membership were confirmed: Members, Messrs. John Demain, of Ripon, James Wood, of Thirsk, William L. Little, of Shotley Bridge, Joseph M. Forrest, of Stanley, and W. H. Brooks, of Haltwhistle. Associates, Messrs. Vincent Kelly, of East Hull, Laurence M. Weldon, of West Hartlepool, and George Neil, of Willington Quay.

SEVERAL GAS ENGINEERING AND DISTRIBUTION PROBLEMS.

By W. W. ATLEY, of Stockton-on-Tees.

In accepting our President's pressing invitation to prepare a paper for this meeting, I am afraid I was prevailed upon at a weak moment, and probably owing to the veiled threat of a severe attack of indigestion after his Christmas dinner if I sent a negative reply. Having agreed, my next difficulty was to find a suitable subject which I might make of sufficient interest to the members of our Association without (shall I say?) poaching on the preserves of those who have recently prepared papers that have been published in the Technical Press. I am a firm believer in the presentation of papers which produce fair criticism and a good discussion capable of amplifying the points raised in the paper. With these thoughts uppermost, I decided that it would perhaps be appropriate to place before you several gas engineering and other problems with which I have been confronted, and how they were solved.

NAPHTHALENE STOPPAGE AT OUTLET TO GASHOLDER.

Soon after my appointment to Stockton, we had considerable trouble with naphthalene in the outlet from No. 3 gasholder—shown at "A" on fig. 1. The inlet and outlet pipes are 24 in. diameter, and the deposition of naphthalene would no doubt be accounted for by the "lean" quality of the gas sent out as a result of insufficient carbonizing capacity of the plant and the stripping enforced by the Ministry of Munitions. Live steam was introduced for about five hours through a 1-in. hole drilled in the top flange cover, and the condensed water extracted by the ordinary syphon pump. This only cleared the obstruction temporarily and partially, for in a few weeks signs of further trouble presented themselves.

It was then decided to employ a solvent for the naphthalene, and creosote oil as used for benzole extraction from the gas was tried. About 200 gallons of this creosote was filled into the outlet pipe and boiled-up with live steam for 24 hours. This very much improved the interior condition of the pipes, and a good deal of naphthalene was absorbed by the creosote. We found, however, by inspection when the top cover was removed, that there was still a considerable amount of naphthalene in hard lumps which had not been attacked by the heated creosote. As these lumps were too large to be dealt with by the hand pump, recourse had to be made to a much more efficient solvent than creosote. It was therefore decided to use 65 p.ct. crude benzole, which had previously been cooled-down to nearly freezing point, to eliminate as much of the naphthalene content as possible. About 200 gallons of this cold-treated crude benzole was then introduced into the holder outlet, and steamed-up in a similar manner to the creosote. The result was entirely satisfactory, as it was found that all the hard lumps of naphthalene had dissolved in the crude benzole, and were removed when the benzole and condensed steam had been pumped out. The steaming had a bad effect on the leather clacks of the hand pump, and these had to be renewed before the pump would act properly.

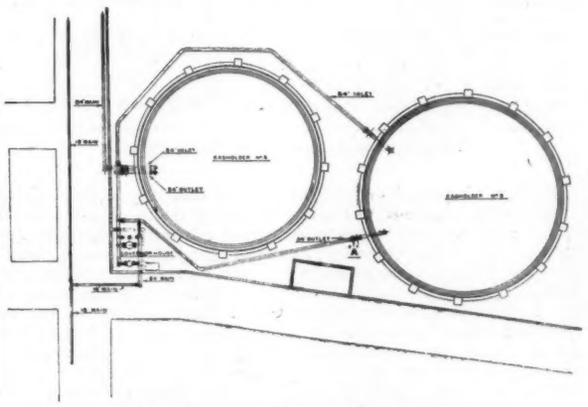


Fig. 1.—Plan of Gasholders and Connections.

Fearing that holders Nos. 1 and 2 and the interconnecting mains might become obstructed in a similar manner to No. 3 holder, a Bryan-Donkin paraffin atomizer has been continuously in use at the outlet of the station meter. This atomizer (see fig. 1A) is operated under gas pressure obtained by a small belt-driven compressor worked from the steam-engine used for revolving the liquor sprays of the tower scrubber. The amount of paraffin atomized varies between 10 and 12 gallons per million c.ft. of gas, and we have found the method to be very effective. The paraffin vapour has gone forward in the gas through the holders and station governor, and been found condensed in the street syphons 500 yards from the works. Since paraffin vapour has been introduced, we have had no further trouble with naphthalene on the works.

OBSTRUCTION IN GAS-MAINS ON THE DISTRICT.

It is quite obvious that, with the almost total blockage of a 24-in. diameter main at the gasholder, one might expect to find the gas-mains on the district in a somewhat similar unsatisfactory condition. This proved to be only too true, and in one district, after repeated complaints from consumers of a short supply of

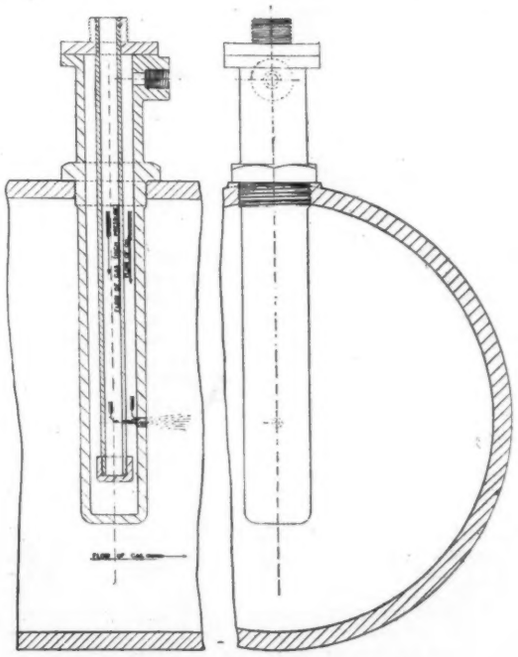


Fig. 1A.—Bryan-Donkin Paraffin Atomizer.

gas, a 5-in. diameter main was found to be completely choked with naphthalene. A number of 1¼-in. diameter trial holes were cut in the top of the main, and crude gas-oil pumped in and

allowed to run in both directions from the highest point to the syphons. The same oil was used three or four times in this manner, until the naphthalene-saturation point was almost reached, and then fresh oil was introduced until the blockage was entirely removed.

The oil in various stages of washing was sampled, and the results of the distillation tests were as follows:

°C.	200.	220.	240.	260.	280.	300.	320.	340.	360.	$C_{10}H_8$.
Fresh Oil .	1·00	2·75	4·00	8·00	20·00	35·0	53·50	69·0	82·50	*Nil*
										P.Ct.
Above, after flushing main once	1·75	2·75	4·50	8·25	20·00	35 50	52·00	67·0	80·50	0·5
Above, after third flushing . .	3·00	3·50	4·50	8·75	19·50	33·50	49·25	64·50	76·00	1·5

Inorganic matter in third sample above = 1·27 p.ct.

During this period we had the greatest difficulty in maintaining an adequate supply of gas to the remote districts of our area of supply; and as the gas produced was of a low heating value (400 B.Th.U.), you will appreciate to the full the justifiable complaints received from these consumers. In order to alleviate these complaints as much as possible, the initial pressure at the outlet of the station governor was raised to 6 in. water gauge. While we obtained comparative relief in the number of complaints from the outlying districts, we soon were inundated with complaints, from consumers near the gas-works, of broken incandescent mantles and of cookers requiring readjustment. After careful experiments, and the taking of numerous continuous pressure records over 24 hours in the various districts, I came to the conclusion that the obstruction was not entirely due to deposition of naphthalene. The service pipes used in Stockton are of wrought iron (steam quality), and the analysis of the deposit taken from these gave the following results:

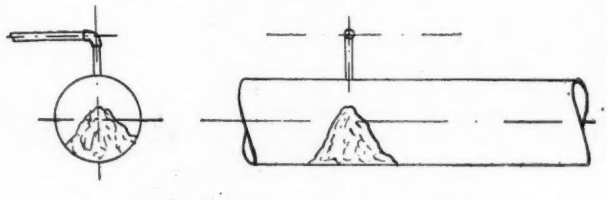
Deposit from Wrought-Iron Service.

	P.Ct.
Moisture	8·65
Ferric oxide	49·55
Ferric sulphide	8·635
Free sulphur	2·00
Organic matter	30·00
Cyanides	Trace

Deposit from Cast-Iron Main after Oil Washing.

	P.Ct.
Moisture	12·14
Total organic matter	85·16
Ferric oxide	2·14

I pictured to myself what happens to the gas-mains when a choked service pipe is cleared by the force pump used at the inlet to the meter, and considered that the obvious result would be for the deposit to pile-up in conical form immediately under the service-pipe connection thus—



It can readily be conceived that, in the case of (say) a 4-in. diameter main and a fairly long service pipe, the deposit forced back into the main from a succession of services would tend to cause a partial, if not a total, stoppage of the main. These conditions were very disconcerting, and appeared to present such a formidable task on the whole of the mains, measuring 72 miles, that I almost despaired of being able to overcome them.

We organized several gangs of men operating in one district under the supervision of a chemist. These men were engaged throughout the whole of the last three summers, pumping crude gas-oil by means of a semi-rotary pump under pressure down the services of street lamps fixed near the highest points in each road; and in several instances holes were cut in the main to introduce the oil.

One particular case I remember had remarkable results. The main under treatment was 10 in. diameter, and had an inclination of 1 in 50; and although two barrels of oil had been pumped in just a little below the highest point, it was two days before any trace of the oil was found at the syphon 220 yards away. The oil used had to be all accounted for, and in order to do this the syphons were cleared of condensation before commencing the oil washing. The results have fully justified the expense in carrying out the cleaning of the mains, for, in consequence, the number of complaints of short gas supply is now practically *nil*.

The gas we are now producing has an average content of 6 grains of naphthalene, and I propose to deal with it in a Holmes washer-scrubber which is at present undergoing a thorough overhaul and cleaning, using as a washing medium crude gas-oil. The washer, consisting of two distinct sections, each section containing six compartments, with a driving engine in the centre, requires adjustment of the centre shaft, which has been found to be out of alignment to the extent of 1 in. in its total length of 30 ft. 10 in. The steam engine for operating this washer is fixed at right angles to the centre shaft, and the speed reduction is brought about by worm gear. This I propose to replace with helical gearing, to obviate the trouble we have experienced with the thrust bearing.

This process of naphthalene extraction has been carried out most successfully at Tynemouth and other gas-works, thereby decreasing considerably the number of naphthalene complaints on the district.

Replacing Station Governor Inlet Valve.

While on the subject of distribution problems, I would again refer you to fig. 1. The 24-in. governor bell was found to be leaking very badly, and also the valve (see fig. 1B) was not working freely. When an attempt was made to dismantle the governor, the inlet valve B (see fig. 1C) was in such a bad condition—due probably to naphthalene deposits not allowing it to be properly closed—that it was found impossible to carry out repairs until the inlet

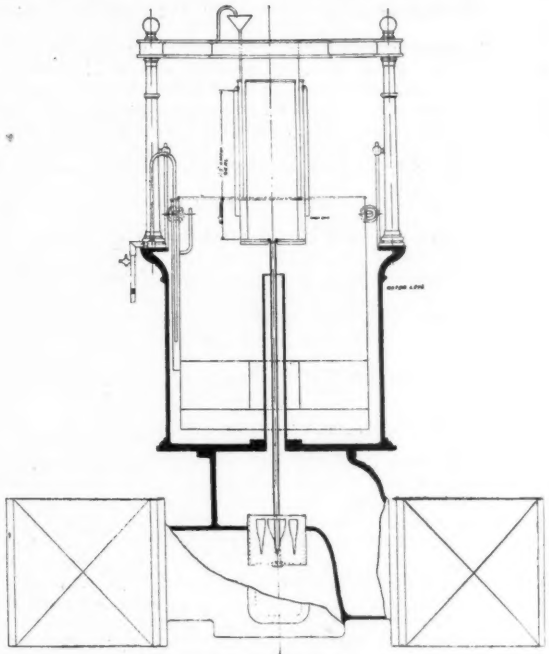


Fig. 1B.—Detail of Governor.

valve was made good, and it was therefore decided to replace it with a new valve.

The position was thoroughly investigated, with the idea, if possible, of maintaining the gas supply to the town through the 15-in. diameter by pass valve C, and shutting the outlet valves D and E on the 24-in. and 12-in. governors respectively, and inserting two gas-bags at the point F while the inlet valve B was changed. The risk of having to shut off the supply to the town if either or both of these bags gave out while supplying at 50-10ths pressure was deemed too serious a matter to warrant its being proceeded with.

As an alternative, it was decided to shut off the portion of main between the outlet valve A at No. 3 holder and the check valve G, so that a 12-in. diameter saddle piece and valve could be fixed at the point H. An 8-in. diameter "R. & P." valve was jointed to the flange on the governor outlet, and the 8-in diameter hole cut through the flange by means of an under-pressure drilling apparatus. The 12-in. and 8-in. valves were then connected-up by suitable special pipes.

By means of this 8-in. connection we were able to maintain a sufficient supply of gas to the town during the time occupied in changing the governor inlet valve B. The new valve was found to be quite tight, and we were thus able to deal with the necessary repairs to the governor.

Cyanogen.

Cyanogen is a constituent of coal gas which I am sure every gas engineer wishes to eliminate, if this can be done at reasonable cost. In proof of this, certain gas-works in this country have installed cyanogen recovery plants working under various patented processes. I understand that the revenue from such plants is not very lucrative; and if some simple and inexpensive method could be devised, it would be welcomed by all concerned with the management of gas undertakings. I found from numerous tests made at the outlets of the washers and scrubbers that the cyanogen content of the crude gas did not vary very much; the average of a number of tests showed 62 grains of cyanogen per 100 c.ft.

at the inlet to the oxide purifiers, and 12 grains at the outlet of the purifiers.

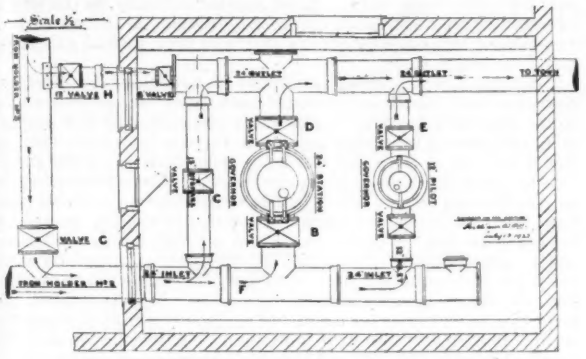


Fig. 1C.—Plan of Governor House and Connections.

We tried spraying the oxide in the purifiers with gas liquor, and found it beneficial in keeping the oxide thoroughly alkaline and in good condition for the removal of H_2S; but there was no apparent reduction in the amount of cyanogen in the purified gas. When using clean water and spraying the oxide in the purifiers with a very fine rose spray—similar to a gardener's watering can—fixed to a 1-in. diameter armoured water hose pipe, there was a distinct improvement in the cyanogen results, and some benefit in the removal of H_2S. Two men are detailed off to manipulate the watering process during the refilling of each purifier, which operation is completed in twelve hours. During the winter period, when it is necessary to use a small amount of steam to maintain the efficiency of the oxide for extraction of H_2S, arrangements are made at regular intervals to remove the covers of the purifiers in turn and give the oxide a thorough soaking with water.

Since the adoption of watering the oxide, we have never had more than a faint trace of cyanogen in our purified gas, with one exception—as shown on fig. 2, recording the results of cyanogen tests over the period from January, 1921, to date.

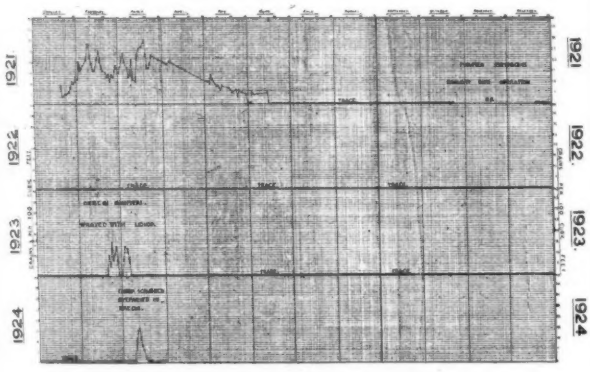


Fig. 2.—Purified Gas—Cyanogen Tests.

In this particular instance, we had reason to think that the oxide was in a sour state, as it was not absorbing the H_2S so readily. We therefore resorted to spraying the oxide in the purifiers with gas liquor. As a result, we had an immediate rise in the cyanogen in the purified gas, amounting at its maximum to 16·5 grains per 100 c.ft., which gradually subsided after the same oxide purifiers had been sprayed with water. Apparently the liquor contained already too much cyanogen to effect more than partial removal of the cyanogen from the gas. We find that the better way of "gingering-up" sluggish oxide is to by-pass the tower scrubber for a few hours—a treatment to which the purifiers very rapidly respond. But it must not be overdone, or the cyanogen will be carried forward into the holders.

Pan-Ash Washing Plant.

The question of recovering the coke and breeze from the pan ashes taken from the retort furnaces is now very much to the fore; and I can strongly recommend the installation of such plants, following my experience extending over the past three years. There are now several efficient plants erected throughout the country; and I think a description of the washer I installed will be of interest. In erecting the plant, my chief concerns were (1) to decide on a type of washer which would deal with the pan ashes efficiently; (2) that minimum labour should be needed to operate same; (3) that the capacity of plant should be equal to any reasonable extensions of the carbonizing plant; and (4) that laborious work should be reduced to a minimum, thereby inducing good steady men to act as attendants.

The plant erected at Stockton (see figs. 3 and 3A) consists of a "Robinson" patent conical washer, in which is suspended a vertical shaft having prongs fixed thereon to act as a stirring medium. A 4-in. diameter cast iron perforated ring pipe is fitted to the base of

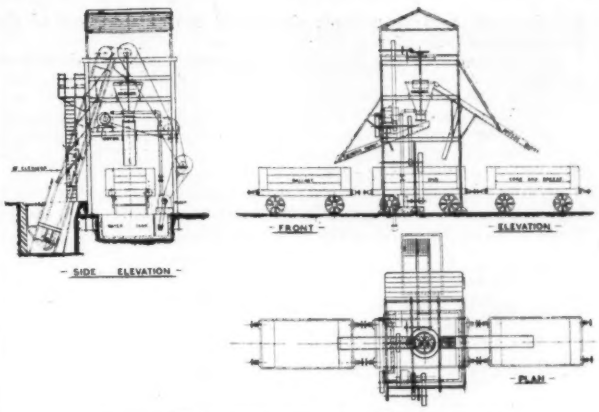


Fig. 3.—Arrangement of Pan-Ash Washing Plant.

the washer. This perforated pipe is connected to a centrifugal pump which delivers the water at a pressure of 11 lbs. per sq. in.

The clinker collecting chamber is attached to the ring pipe; and, by means of sliding doors, this chamber is emptied at suitable intervals, depending on the quality of the pan ashes under treatment (see fig. 3A). The pan ashes are shovelled direct from the ash pans of the retort furnaces into a telpher skip fitted with solid plates. The skip is moved on an easy running bogie (fitted with roller bearings) along the full length of the retort bench, until it is clear of the stage floor. At this point the skip is hooked on to the low-level telpher, and the ashes are deposited on a sloping bench near the elevator pit of the washer.

A man is employed to rake-down the ashes gradually over an iron grid having 7-in. spaces, to arrest any very large pieces of clinker, and thus feed the elevator, which consists of 12-in. cast malleable buckets fitted with 3 in. by ½ in. skidder bars. The skidder bars work on 3-in. angle steel runners fitted with 2 in. by ½ in. flats as wearing strips, so that any wearing-away can be remedied at small cost. The coke and breeze are forced to the surface of the water, and washed-down the overflow spout into a wagon placed directly underneath. This overflow spout is fitted with a perforated plate having ¼-in. diameter holes, and also a false bottom, to convey the drained washing water back to the concrete water tank placed under the railway lines.

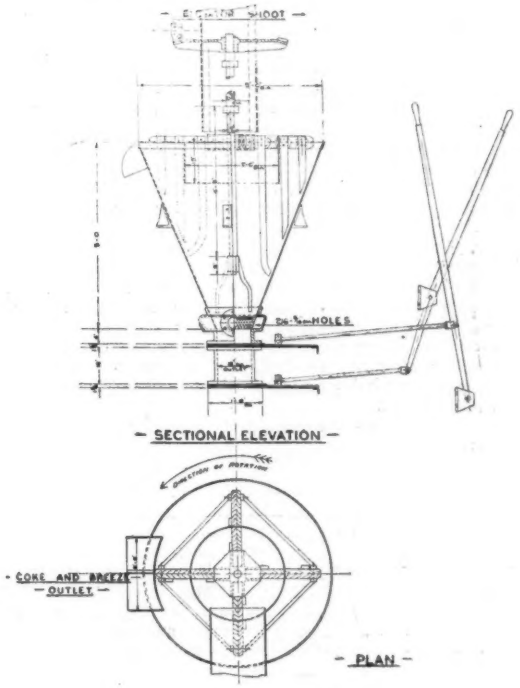


Fig. 3A.—"Robinson" Conical Washer.

When this plant was first started, we had considerable trouble with the fine silt, which rapidly filled up the water collecting tank, and necessitated its being cleaned out on alternate days. This has now been practically overcome by allowing the overflow water from the coke shoot to pass into an old railway wagon, which acts as a filter, resulting in the water tank having now to be cleaned-out only once in ten days. I have recently experimented with a steam injector, with the idea of removing the collected silt from the water tank every other day; the outlet of the injector being placed over the silt wagon. This works

satisfactorily and has entirely eliminated the cleaning-out of the underground tank by manual labour.

The washer is driven electrically, and the power required is as follows:

Washer	3 amps.
Elevator	2 ,,
Pump	17 ,,
Total	22 ,,

Two men are required to work the plant, which is capable of dealing with seven tons of pan ashes per hour. A recent test, on the basis of an 8½ hour day, gave results as follows:

	Tons.	Cwt.		
Pan ashes treated	48	10		
Yields—				
Coke and breeze	21	1	= 43·5	p.ct.
Clinker ashes	25	4	= 52·1	,,
Silt	2	1	= 4·1	,,
	48	6	= 99·7	,,

Labour on Plant.

	£	s.	d.
1 man 8½ hours at 1s. 1·79d. per hour 1 man 8½ hours at 1s. 1·04d. per hour	0	19	0
Electricity, 42 units at 1½d.	0	5	3
Water, oil, waste, &c.	0	0	6
Shunting (say)	0	1	9
Depreciation, 10 p.ct. on £1000	0	5	6
Interest on capital, 6 p.ct.	0	3	3
	£1	15	3

	£	s.	d.
Yield—			
21 tons 1 cwt. of coke and breeze at 15s. per ton	15	15	9
Expenditure	1	15	3
Net return	£14	0	6

In making these tests, the weights in each case have been corrected for a moisture content of 23·8 p.ct.—which was the moisture in the original pan ashes. The make of pan ashes for 24 hours is 20·43 cwt. per bed, or 8·15 tons for 8 beds producing 1¾ million c.ft. of coal gas. In winter the plant is worked every other day for about half-a-day.

The results from May 27 to Nov. 16, 1921, were as follows:

	Tons.	Cwt.		
Coke and breeze recovered	1302	13	= 37·7	p.ct.
Clinker and silt ,,	2147	8	= 62·3	,,

The value of the coke and breeze is really more than 15s. per ton; but, as it is all used on the works for steam-raising purposes, we are thus able to dispose of a large proportion of the breeze taken from the hoppers. Over the last twelve months we have marketed 1573 tons of breeze, yielding 15s. 1d. per ton f.o.r. at the works. Since the installation of the telpher plant and before the introduction of this washer, there was little or no breeze for sale, the steam boilers consuming practically the whole production. The plant had hardly been erected before we were in the throes of the disastrous miners' strike which lasted from April 1 to July 1, 1921; and owing to the fact that we had a considerable accumulation of pan ashes waiting to be treated on completion of the washer, we were able to raise all the steam required in the main boilers by means of the coke and breeze produced by this washer. It was therefore a direct means of preventing additional losses on the gas undertaking during this trying period, which showed a deficit of £16,000 on the six months' working.

No account in the balance-sheet has been taken for removing the ashes from the retort-house, as this work is included in the shift duties of the fireman and the telpher attendant. The plant has been designed to minimize labour; and the only handling is the feeding of the elevator. The recovered coke, breeze, silt, and rough clinker are all dealt with by locomotive power; the wagons employed being condemned railway wagons with bottom discharging doors.

An average test of the coke and breeze, &c., recovered, is as follows:

—	Taken Direct from Plant.		After Drying for 3 Days.	
	Moisture.	Ash (On dry basis).	Moisture.	Moisture Loss.
	P.Ct.	P.Ct.	P.Ct.	P.Ct.
Original pan ashes	23·80	52·00	16·94	6·86
Coke and breeze	23·20	18·40	14·60	8·60
Rough clinker	18·70	73·20	14·00	4·70
Silt	35·10	57·20	34·80	0·30

Coke Quenching.

I think it is generally accepted that in gas-works using a telpher as the means of removing the coke from the retort-house, the time required thoroughly to quench the coke entails serious delay in the stoking operations. In fact, one might term the telpher the bottle-neck of the carbonizing plant.

When the new bench is in full operation, 80 retorts (19 cwt. charges) have to be dealt with in about 6½ hours. This was found to be almost an impossibility when the telpher skip only contained the coke from one retort. To overcome this difficulty, the telpher has been strengthened to permit of a skip being used having a capacity equal to the coke discharged from two retorts. This immediately reduced the number of telpher journeys by 37·5 p.ct., the bottom tier of retorts having still to be dealt with by the smaller skip. The increased quantity of coke carried in the larger skips created another difficulty, as the length of time required to quench the coke by dipping in the water tank neutralized to a large extent the saving in time we had gained by using the larger skips.

I considered the existing conditions of quenching, by means of the overhead cast-iron sectional tank, very dangerous, owing to the fact that it was often necessary (depending on the amount of coke in stock) for horses and carts to pass under this tank at the same time as the coke was being quenched. In order therefore to speed-up the quenching operation, and to eliminate as far as possible any danger from the hot water flushing over, we have fixed a tier of sloping plates on the top of the existing quenching tank, and resting on these plates is a 2-in. diameter, perforated water-spraying pipe. The water for the spray is turned on automatically by means of a long lever specially designed so that as the coke skip is lowered into the water tank it presses down the lever operating the water cock. This lever is suitably weighted, so that it closes as the skip is raised. The lever operating the water cock has been somewhat troublesome, owing to its length and fairly light construction; but this has been overcome by fixing a ⅜ in. diameter chain to each side of it, and carrying the chain over a pulley wheel on each side of the tank—a balance weight on each end of the chain keeping it taut. This will perhaps be better understood by referring to fig. 4.

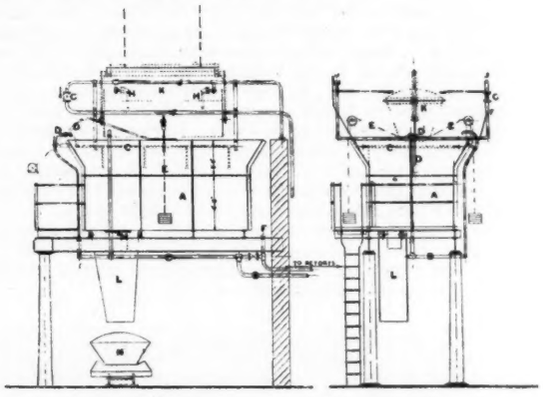


Fig. 4.—Arrangement of Quenching Plant.

A	Quenching tank.
B	3-in. water delivery pipe from pump to sprays.
C	2-in. perforated spray pipes.
D	Operating lever for water cock.
D/1	Water cock to 2-in. spray pipe.
E	⅜-in. guiding chains for lever D.
F	3-in. town's water supply.
G	Master cock to spray jets.
H	Universal spray jets.
J	2-in. water main for spray jets.
K	Hot coke skip.
L	Movable breeze outlet shoot.
M	Outlet door for breeze.
N	Breeze skip.

The coke skip, when being lowered, engages with the two guiding chains, and thus prevents the water cock lever from being distorted.

In order to reduce still further the time required to quench the coke, four overhead adjustable spray jets have been fixed over the quenching tank. These jets are all operated from one cock, which is under the control of the telpher driver. By this means, it is not necessary to dip the coke skip so far as would otherwise be necessary into the water. We have found this arrangement very effective.

Spray jets are also placed at a convenient level in the retort-house, opposite the centre of each bed on the coke discharging side. This method of quenching is, in my opinion, much easier than either the old-fashioned system of throwing on water by buckets, or a flexible hose pipe. It has the distinct advantage of enabling one, two, three, or even four sprays of water to be played on the hot coke at one time without attention, thus reducing to a minimum the labour required for quenching. In addition to a full-size section of the jet, shown in fig. 5, which you will observe is constructed on the principle of the universal joint, I have had prepared a quarter-size model for your inspection.

The pressure of water in the mains—only 30 lbs. per sq. in.—was not sufficient to provide the water necessary for the retort-house sprays and the quenching tank, and it was therefore decided to instal a reciprocating pump to work the quenching tank sprays efficiently. In conjunction with this arrangement, a disused engine house below the level of the retort house clinkering floor was converted into a tank to collect all the surplus water from the retort furnaces, quenching of coke skips in retort-house, water-gas plant condensers, &c. The water so collected is filtered, and by means of the pump is delivered through a receiver to the quenching tank

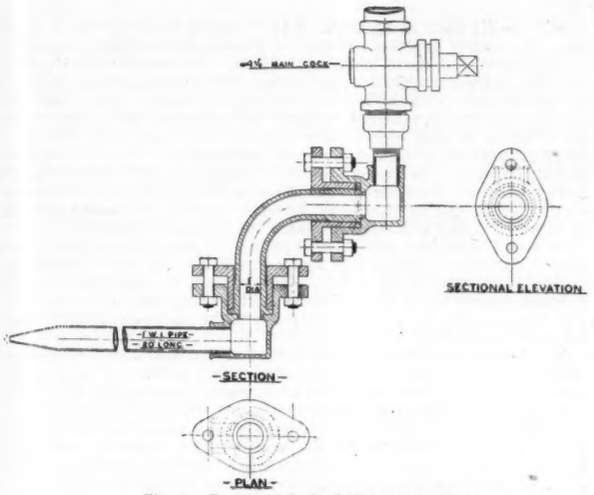


Fig. 5.—Detail of Swivel Universal Joint.

sprays. A relief valve is utilized to by-pass the delivery water into the suction pipe when the pressure in the former exceeds 50 lbs. per sq. in. Fig. 6 shows in outline the lay-out of this scheme. The pump, receiver, connections, &c., cost £300, and during the past twelve months we have effected a saving in water consumption of 20,874,000 gallons, equivalent to £621 3s. 1d.

GAS-FIRE PROPAGANDA.

Before concluding my paper, I thought I might usefully refer to the phenomenal increase in gas consumption for the year ended

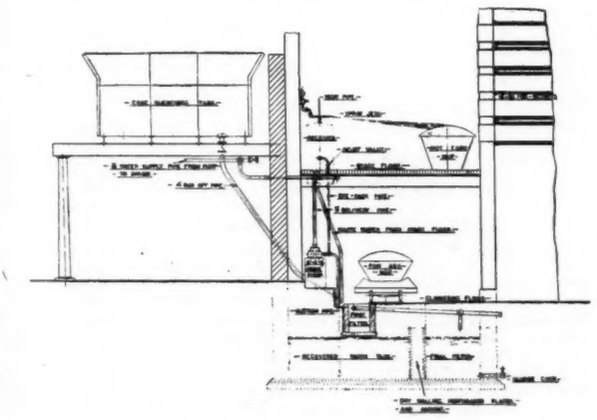


Fig. 6.—Recovery of Coke Quenching Water.

March 31, 1924, which I attribute to the new policy that has been adopted with regard to the fixing of gas-appliances. Prior to March, 1923, gas-cookers were the only appliances dealt with and fixed by the Stockton Corporation Gas Department, and let out on simple hire at low quarterly rentals. The question of letting out gas-fires on similar terms to gas-cookers was brought up for consideration about two years ago, but it was turned down owing to opposition from certain quarters. The matter was again discussed in February, 1923, and I am pleased to say that a very satisfactory arrangement was come to with the local plumbers, whereby they undertook to lay the compo pipes and instal the fires at a fixed rate up to 30 ft.—any extra length to be paid for by the consumer.

This system has worked very well indeed, and the plumbers are now fixing practically all the fires we are supplying; the Gas Department employees being fully engaged in fixing gas cookers, &c. When the work was first commenced, several of the plumbers appeared to have struck a "bad patch," as the fires they were deputed to fix required an average length of 28 to 30 ft. Later on, however, they became more reconciled on receiving instructions to fix fires that only needed some 10 to 12 ft. of ½-in. pipe.

The fear of any partiality on the part of the Gas Department in distributing the gas-fire orders was entirely eliminated, as it was decided at the outset that, on the day the fires were delivered to the consumers' houses, a list of the names and addresses of the consumers and description of fire required should be sent to the Secretary of the Plumbers' Association, who alone is responsible for the allocations. I consider that this is one of the main points in creating the atmosphere of confidence that now exists. The plumbers are encouraged to obtain business, and for all approved orders sent in they are allowed a commission equal to one-half of the annual rent of the fire or radiator concerned.

The annual rent is calculated at 10 p.ct. on a fixed average sum for installing (which includes compo pipe, brass floor cock, and brass pipe) and the net cost of the apparatus. The rent is worked out to the nearest sixpence, and divided into two payments, due respectively on Dec. 31 and March 31 in each year. The apparatus hired out is maintained free (with the exception that asbestos fuel replacements are charged up at cost price), and inspected annually. In deciding on these terms, it was considered that the apparatus would be used more frequently if it was properly looked after; and if the Gas Department retained this responsibility, they could be assured of the gas-fires, &c., remaining on hire, and not being repeatedly changed on the plea of inefficiency. A cast-brass badge is attached to all apparatus let out on hire, bearing the following inscription—

THE PROPERTY OF THE
No. A
GAS DEPARTMENT
STOCKTON-ON-TEES CORPN.

A pink card (1) in duplicate is attached to each fire before delivery. The plumber retains one, and returns the other to the gas office duly filled in. A member of the staff is responsible for the inspection of all gas apparatus when fixed, and is required to sign the card that all is in order before payment is made for the fixing. Certain details are taken from card No. 1 and entered on card No. 2 (blue), which is intended to record a complete history of each fire, &c., including the dates of inspection and repairs. These cards are filed in a card index system, the No. 1 (or pink) cards being filed in alphabetical order, and the No. 2 (or blue) cards being filed in the numerical order of the badge numbers. The details of the cards are as follows:

No. 1 (Pink).

Name ..... Address .....
Description of Fire ..... Badge No. .....

MATERIAL USED:
Compo Pipe. Diameter ..... Length ..... Feet.
½-in. Brass Pipe ..... Length ..... Feet.
Sundry Fittings .....
Brass Floor Cock supplied by Gas Department. Yes/No.
Received in good order by .....

Fixed by	.....
Date Fixed	.....
Inspected by	Account passed by .....
Date Inspected	Date passed for Payment .....

Remarks .....
.....

No. 2 (Blue).

STOCKTON-ON-TEES CORPORATION—GAS DEPARTMENT.

GAS FIRES AND RADIATORS.

Name Address
Name of Maker Name and Size of Fire Radiator Badge No.
Fixed by Date Fixed Inspected by

COST OF FIXING.

MATERIALS.					LABOUR.					
			Price	£	s.	d.	Workmen	Hours	Rate	£ s. d.
Compo Pipe Ft. Dia.										
½-in. Brass Pipe Ft.										
Brass Fittings										
Floor Cock										
									Total Cost of Fixing	£

The gas-fire campaign was launched by means of continuous advertisement in the four local newspapers, and a month's display of large posters. Three firms of manufacturers each provided a canvasser, the area of supply was divided into three sections, and lots were drawn as to which district each canvasser would be allotted. When I tell you that the canvassers are all still at Stockton, and the firms are satisfied with the business they obtain, I think this speaks for itself as to the success of the venture. The total number of fires fixed from March 6, 1923, to March 31, 1924, was 1447; and at the same time orders secured for cookers (fixed by the Corporation employees) amounted to over 1500.

In addition to letting out gas-fires and cookers on simple hire, we are now doing a fair business in gas-heated wash boilers, either on hire-purchase terms extending over eight quarterly

payments or by cash sale. We arrange to fix these free up to within 10 ft. of the existing gas-cooker.

Tables I. and II. will, I think, prove conclusively that good progress has been made since we inaugurated our gas-fire and cooker campaign. The phenomenal increase for the year ended March 31, 1924, shows the advantage of stating results on the therm basis for comparison; though the percentage increase in 1924 as compared with 1923 is 16·11 in cubic feet, the increase in therms is 22·43 p.ct. It is quite evident that, if gas consumption can be increased to this extent during a most unprecedented slump in trade which has affected Stockton in a very marked degree—shipbuilding being the staple industry—we may reasonably hope, when trade revives, to show a still greater expansion.

TABLE I.—*Gas Apparatus Fixed.*

Year ended March 31	1921.	1922.	1923.	1924.
Cookers	497	219	921	1536
Fires	..	..	176	1271
Radiators	..	..	3	109
Wash boilers	..	..	..	36*
	497	219	1,100	2952

* From Oct. 16, 1923.

TABLE II.—*Monthly Comparison of Gas Consumption.*

Month.	1922.			1923.			Increase over Last Year.				Percentage Increase from April 1 to date.	
	C.Ft.	Therms.	C.V.	C.Ft.	Therms.	C.V.	C.Ft.	P.Ct.	Therms.	P.Ct.	C.Ft.	Therms.
April	33,876,400	151,746	448	35,643,700	164,317	461	1,767,300	5·21	12,571	8·28	—	—
May	29,178,200	136,846	469	30,392,300	145,883	480	1,214,100	4·16	9,037	6·60	4·73	7·49
June	26,317,800	126,082	479	28,508,800	135,702	476	2,191,000	8·32	9,620	7·63	5·79	7·53
July	27,555,300	128,683	467	33,418,600	159,072	476	5,863,300	21·27	30,389	23·61	9·44	11·34
August	27,712,500	131,357	474	34,703,700	164,537	477	6,991,200	25·23	33,180	25·26	12·46	14·05
September	32,275,300	151,048	468	38,014,100	187,409	493	5,738,800	17·78	36,361	24·07	13·43	15·88
October	41,558,500	194,078	467	47,653,000	234,452	492	6,094,500	14·66	40,374	20·80	13·57	16·81
November	47,166,600	221,683	470	54,760,200	274,348	501	7,593,600	16·09	52,665	23·76	14·09	18·06
December	53,105,100	249,594	470	61,802,300	311,483	504	8,697,200	16·38	61,889	24·79	14·48	19·18
	1923.			1924.								
January	50,461,900	235,152	466	61,399,200	307,610	501	10,937,300	21·67	72,458	30·81	15·47	20·77
February	44,821,200	205,729	459	*52,391,600	263,006	502	7,570,400	16·89	57,277	27·84	15·62	21·52
March	42,541,200	196,140	462	51,439,100	257,710	501	8,897,900	20·91	61,570	31·39	16·11	22·43
Totals	456,570,000	2,128,138		530,126,600	2,605,529		73,556,600		477,391		16·11	22·43

Mention at this juncture might be made of the fact that the Stockton Corporation possess a live and progressive Electricity Department, and the healthy rivalry between the two departments, gas and electricity, has had a stimulating effect which has been of benefit to both.

In conclusion, I trust the experiences I have brought to your notice this afternoon will create a useful discussion, and also act as an incentive for other members of the Association to pass on to us the troubles and difficulties with which they have been confronted.

Discussion.

The PRESIDENT said they had had a very interesting paper from Mr. Atley, and the best way to thank him was to have a good discussion on it. They had not had an opportunity of reading it beforehand, and this was somewhat of a disadvantage in discussing any paper. Many of them probably had had experiences similar to those related by the author. With regard to naphthalene, many of them had experienced like difficulties and had gone through the same stages as he had done, both as to methods concerned with naphthalene and the clearing of holder outlets and mains in the town. He (the President) had found on one occasion that the outlet to the holder was blocked with naphthalene, and on steaming had melted it down and pressed it forward into the outlet. On another occasion he had used 100 gallons of benzole, and steamed it; but shortly afterwards there was a bad block in the outlet, which was treated in the same way. With regard to clearing mains, he had had only one experience, and he had dealt with it as Mr. Atley did. Naphthalene was a very illusive thing. They did not know why they got it in one set of working conditions and not in another. Sometimes there would be no trouble with naphthalene, and at others there was a lot of trouble. The best plan was to take it out before it got to the holder, as Mr. Atley had suggested; for if it was in the gas, they only wanted a slight change in the temperature and they might have it in one locality and not in another. They might get naphthalene on the service in one street and not in another. As a rule, all services now were screwed proportionately to the thickness of the main, which enabled them to put more threads on, and to ensure that the service did not go through to the main. Where they were troubled with naphthalene, this was a wise precaution. Mr. Atley's method of dealing with the governor inlet valve was a good one. A thing like this caused anxiety. With regard to cyanogen, the washer described by Mr. Atley was a simple one, but he must confess that he did not quite understand its operation. How was it that the water should result in removing the cyanogen while liquor did not? He would like to know when Mr. Atley extracted cyanogen, and whether it affected the condition of the oxide and its capacity for sulphur. He would have thought that it would reduce the activity rather than increase it. Mr. Atley had said that, when it was extracting more cyanogen, it was extracting more sulphur. He would hardly have thought this when working oxide up to 48 to 50 p.ct. of sulphur. The pan-ash washing plant spoke for itself. It seemed to have been well worth while at Stockton. He thought that it would be able to pay for itself at large works; but in smaller ones, he questioned whether it would be worth the capital outlay. They had two men on the works, whereas at small undertakings half-a-man would be sufficient to deal with all the pan-ash they could get. The gas-firing propaganda at Stockton was very interesting. The life of a gas-heater, however, was not equivalent to that of a cooker; and the adoption of a simple-hire system would have to be justified by an increased output of gas, and, of course, an increased profit. It seemed to have been well justified at Stockton, where the increase was about 20 p.ct. This would result in a sinking fund enough to provide for the installation of gas-fires. Simple hire alone would not do this. Before an undertaking went in for a simple-hire system, it would have to be satisfied that it could get sufficient increase in consumption to provide for a sinking fund. Mr. Atley was to be congratulated on what he had done at Stockton.

Mr. SHADBOLT, of South Bank, remarked that Mr. Atley's paper was more useful and more keenly interesting to his colleagues than many of the papers read, which were of a more sensational nature and dealt with more specialized branches of the gas industry. He hoped it would inspire other members to bring forward papers of an equally useful character. Papers of this kind enabled them to share one another's experiences. He thought Mr. Atley's experience with governer connections was a good "safety first" object lesson to them. The effect of spraying water on the purifiers was interesting. He had been doing a little in the same direction. The use of condemned railway wagons with bottom discharging doors was to be commended, but what they did for the ornamentation of the works the speaker could not say. As to gas-fires, they would all recognize the gulf there was between the gas companies and the corporations in financing simple-hire schemes. They might differ on this, and Mr. Atley might be right from his point of view, while the companies might be right from theirs. The Author had overcome the old municipal difficulty with the plumbers, and was to be congratulated on this.

Mr. C. DRU DRURY, of Sunderland, suggested that they could sometimes learn more by discussing their failures than their successes. The paper covered an enormous amount of ground—from carbonization to the sale of gas—and they were all interested in the subjects mentioned. As regards naphthalene, they all had trouble with this substance. In Sunderland, they had had considerable trouble with it ten years ago, when they adopted certain palliatives most of which gave promise of being successful at first, but which did not prove a permanent remedy. They saw the washer at Tynemouth, and decided to take the naphthalene out of the gas at the works. They had had a Holmes washer working since last October, and they hoped to obtain good results regarding the extraction of the naphthalene. The position was improving, but they still had complaints. The effect of washing was to take the naphthalene out; and the result was a gradual diminution of the naphthalene content of the gas from 5 to 2½ grains. It could only be a question of time before they entirely got rid of this trouble. As an apparatus, they considered the washer very satisfactory. Coming to the pan-ash washer, he was a firm believer in this method of abstracting combustible matter. They had adopted pan-ash washers some years ago. Last autumn they had introduced a "Columbus" washer, and the results had been remarkable. The pan ash was passed through a screen, and they got a silt which was perfectly dry and, they believed, a commercial product. They got about 18 p ct. of fine ash, which could be used. The clinker was clean, and could be removed without any expense to them. The coke and the breeze recovered amounted to about 40 p.ct.

Mr. A. W. BRANSON, of West Hartlepool, stated that he had had no experience of cyanogen. They used 25 p.ct. lime purification, because they had not the accommodation to spray oxide. Lime purification cost ¼d. per 1000 c.ft. Regarding the pan-ash plant, he thought the startling feature was the great quantity handled in a given time. Fifty tons of ash in 8½ hours was a large capacity. He congratulated Mr. Atley on his gas-fire campaign; but whether he was right in hiring fires at such a low percentage was a matter for thought.

Dr. G. WEYMAN, of Newcastle, remarked that, in spite of the removal of cyanogen, Mr. Atley apparently still had corrosion. The corrosion deposit was in the service pipes. He would like to know if it was in the wrought-iron service pipes. After they removed the naphthalene, they appreciated that there was something else there in the way of deposits, and he thought a good deal of the corrosion trouble was hidden because the naphthalene obscured it. The watering of oxide appeared

to him to be a rather tricky method of dealing with cyanogen. If they were not very careful, they might not be able to purify the gas.

Mr. C. F. BLENCOE, of Middlesbrough, suggested that, as Mr. Atley had set the pattern, they might get many more papers like his.

Mr. F.C. WILLIS, of Tynemouth, said that the only thorough and systematic way to deal with naphthalene was to treat the gas at the works. As Dr. Weyman had said, the removal of naphthalene did not mean the removal of everything. Internal corrosion went on, and they could not claim that the removal of naphthalene was going to overcome all the other difficulties. They had deposits in lead pipes; and it did not necessarily follow that the introduction of lead services was going to cure all their troubles. There were great differences in the quality of wrought-iron service pipes. They should obtain a certificate of quality from the makers. At Tynemouth, they were doing this to eliminate undesirable material. He had not tried one of the pan-ash machines. It was interesting to find that there was 40 p.ct. of coke and breeze in the pan ash.

Mr. A. H. BAGSHAW, of Sunderland, stated he would like to know the effect of the cyanogen process on the efficiency of the oxide.

Mr. J. R. HENDERSON, of Wallsend, asked why both governors led into the service pipe, and how this system was working.

Mr. ATLEY, replying to the discussion regarding the cyanogen extraction, said that up to the present they had felt no ill effects from the addition of water to the oxide. They did it within reason. They had ten purifiers. At some works with the same capacity as at Stockton they might not have the same purifying capacity, and therefore they might possibly encounter some difficulties. With regard to oxide, they had just sold some which gave 48 p.ct. of sulphur on the dry basis. If the oxide was too wet to sell, they ceased spraying for a week or two, and dried it. The oxide was put into bottom-door wagons and left outside for a week. There was no danger of fire, as they had it under control in the condemned wagon. They were going to put these wagons through the disintegrator. The condemned wagons had been a very good investment. He had not had to take up old mains, but he had diverted one; and he was very much surprised at its condition. Inside and out, the main was perfect, and he knew that it had been laid for at least 25 years. As to the corrosion of wrought-iron service pipes, he had been experimenting in a few houses with lead service pipes, and in others with steel pipes encased in creosote covering. After these had been in for some years, they might find out which was the more suitable They had not used any coke or breeze recovered from pan ash except for boiler fires.

The PRESIDENT remarked that the discussion which had taken place was the finest compliment which could have been paid to the paper.

At this point, the PRESIDENT intimated that he would have to leave the meeting, and that Mr. Shadbolt would preside over the remaining part of the proceedings.

Mr. NORMAN S. COX, Hon. Secretary and Treasurer, said they could not take leave of the President without expressing their high appreciation of his services in the past year.

Mr. HERBERT LEES, of Hexham, moved a vote of thanks to the President, and included in his resolution a vote of thanks to the Secretary and Treasurer, to the Committee, and to the Auditor for their services.

The proposal was heartily agreed to.

The PRESIDENT briefly replied, and said he had been excellently supported during his year of office.

Mr. JOHN E. MORFETT, of Sunderland, then read a paper entitled "Linking Up Rural Areas with a High-Pressure Gas Supply." [This is unavoidably held-over.]

NEW OFFICERS.

Thereafter, the Secretary presented the scrutineer's report, which showed that Mr. Shadbolt had been elected President for the ensuing year, and Mr. Atley, Vice-President.

Mr. Herbert Lees, Mr. T. P. Ridley (Newcastle), and Mr. Thomas Spencer (Seaham Harbour) were elected to the Committee. Mr. Norman S. Cox was re-elected Hon. Secretary and Treasurer, and Mr. C. H. Armstrong was re-elected Auditor.

The PRESIDENT proposed that the place of the next meeting of the Association in October be left in the hands of the Committee, with a view to his inviting the Association to visit his works at South Bank.

Tea was afterwards provided by the Newcastle and Gateshead Gas Company.

Gas-Meter Testing—Leeds Visits Manchester.

A deputation of the Leeds City Justices, including Dr. A. Hawkyard, Alderman R. Pickersgill, Alderman F. Fountain, Councillor T. Rushton, Mr. J. D. Hooper, Mr. F. Richards (Clerk to the Magistrates), and Mr. W. Templeton (the Inspector of Gas Meters), visited Manchester on Tuesday, April 30. The visitors received a welcome on behalf of the Manchester Justices Gas Meter Testing Committee from Mr. H. N. Barrow, the Chairman, and by the courtesy of the Magistrate's Clerk (Mr. Robert Bell), had an interesting view of the Police Courts and a résumé of the system of working. After lunch the Gas Meter Testing Station was visited, when the equipment—the excellence of which deeply impressed the visitors—was examined, and the system of working very ably explained by Mr. A. Winterbottom, the Chief Inspector.

Mr. Edwin Charles Bode, of Westcliff-on-Sea, who was Secretary of the Continental Union Gas Company, left estate of the gross value of £2163, with net personalty £2046.

COKE FUEL AND ELECTRICITY WORKS.

After listening to the paper by Mr. H. N. ALLOTT and Mr. S. L. PEARCE, and the discussion upon it, at the meeting of the Institution of Civil Engineers last week, a correspondent wrote as follows:

The developments in connection with the large electric power stations of the country have a special interest for the gas industry, inasmuch as attention is being given to the use of coke as a fuel. For instance, at the Barton Power Station of the Manchester Corporation, which is the first of the large power stations for serving the Lancashire and Cheshire area under the Electricity Commissioners' proposals, the chain-grate stokers in the boiler-house are designed to give their normal evaporation when using equal parts, by weight, of coal and coke breeze. The arrangements are such that the coal and coke can be fed separately or together to the furnaces, the two fuels being stored in separate bunkers.

Such a line of progress, of course, is of enormous importance to the gas industry; and the new features in the design of the Barton Station in this respect (of which little has been heard) will be of special interest, as they have a direct bearing upon the question of the more extensive and efficient utilization of low-grade slack coal and the recovery of the chemical and liquid bye-products of coal distillation, adequate supplies of which are of daily increasing national importance. The disposal of coke has in the past been a serious problem, although much progress has been made in finding additional markets, thanks to the splendid work of the London Coke Sales Committee. With a view to avoiding over-production of coke, many gas authorities have adopted water-gas plants; but the present-day cost of carburetted water gas per therm is greater than that of straight coal gas. Thus, in order to produce a saleable coke and avoid as far as possible the formation of breeze, relatively expensive coking coal has been used, almost exclusively, at most gas-works. The coke so obtained, however, especially for use with mechanical stokers, has to be graded, whereas the coke made from relatively cheap non-coking coal leaves the retort in a form suitable for admixture with low-grade slack on such a system as that adopted at Barton. Thus the importance of the use of coke from non-coking coal is of a twofold importance, and the lead given at Barton is likely to be reflected in future similar designs, and even in the case of smaller power stations.

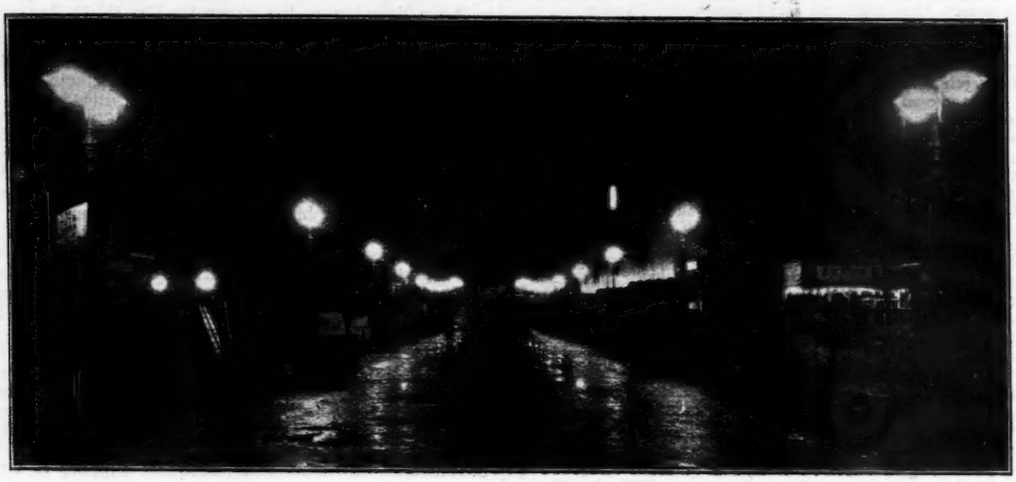
The London Coke Sales Committee, through its principal spokesman, Mr. E. W. L. Nicol, has advocated such a line of development ever since the coal strike of 1912, and many successful experiments have been carried out. It is common knowledge among those interested that these experiments resulted in the evolution of the "sandwich" system, in which low-grade slack and coke breeze are burned in superimposed layers on chain grate stokers. Inferior slack coal with 75 p.ct. of coke was found to give the full normal evaporative capacity of the boilers to be developed in a power station not many miles from Barton, and certain large electric power stations in the London area have also used the system with success, both practically and financially, during and since the war.

Thus the Barton scheme is not the first of its kind; but it opens an important prospect for the future, because electrical engineers, like most other human beings, are prone to imitate and are never ashamed to accept improvements demonstrated by their colleagues to be satisfactory. The results obtained so far at Barton have fully satisfied those responsible, and the work being done there will inevitably have a far-reaching effect upon co-operation between the gas and electricity industries, which has for a long time been advocated as desirable by the leaders in both industries.

"S.A.G.E.M."

Arrangements have been made for the members of the Southern Association of Gas Engineers and Managers to visit their President, Mr. Leonard J. Langford, at Tunbridge Wells, on Thursday and Friday, the 22nd and 23rd inst. On the first day, the visitors will be entertained to tea at the Tudor Café, Mount Pleasant, at 5 p.m., by the President and Mrs. Langford, after which a meeting of the Eastern District will be held, to which members from the Western District are cordially invited. Next morning, the members will be early on the move, as the President has arranged a full day's programme for them. Assembling at the Company's Central Offices, 44, High Street, at 10 a.m., an inspection will be made of the showrooms, stores, and stove-repairing shops. Three-quarters of an hour later, motor coaches will leave the offices to convey the visitors to the gas-works, round which they will be conducted by the President and members of his staff. At 12.30 return will be made to the Spa Hotel, where the Chairman and Directors of the Tunbridge Wells Gas Company will entertain the visitors at luncheon. In the afternoon there will be a circular motor tour, passing over Broadwater and Ashdown Forests to Hever, where the visitors will have the privilege of inspecting Hever Castle and grounds by kind permission of Major the Hon. J. J. Astor, M.P. The return journey will made *vid* Leigh (where tea will be served at "The Old Barn") and Tonbridge. Tunbridge Wells will be reached about 7 p.m. Given fine weather, the day is bound to be a most delightful one.

THE LIGHTING OF THE AMUSEMENTS PARK AT THE BRITISH EMPIRE EXHIBITION.



[*Photo. by Campbell Gray.*

NIGHT PHOTOGRAPHS TAKEN IN A HAZE.

Rain and hazy conditions of the atmosphere during the past week have rendered the taking of night photographs in the Exhibition grounds a task from which little good effect could be expected. The visibility has in these circumstances been very low; but, although a haze prevailed at the time, an attempt to secure pictures was made on Thursday evening. The result does not do justice to the excellent lighting in the Amusements Park, in which it is possible, after daylight fails on a normal evening, to walk along and read a newspaper. However, we reproduce the photographs taken on Thursday last; but readers must bear in mind the conditions under which they were obtained, otherwise an injustice will be done to the lighting. "Wembley" lamps by Messrs. H. Staniforth & Co., Ltd., of Cricklewood, N.W., are used. The details of the lamp, together with information as to the notable piece of outdoor illumination, were given in our Exhibition Number last week [p. 323].

[*Photo. by Campbell Gray.*

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

The Mechanical Handling of Materials.

An evening somewhat out of the ordinary, but none the less interesting on this account, was spent last Friday week by members, at the Westminster Technical Institute, S.W., when a "Bioscope Talk" on "The Mechanical Handling of Materials" was given by Mr. F. H. F. Hampton, a member of the American Institute of Mining and Metallurgical Engineers. Owing to urgent business abroad, Mr. R. K. Stockwell (the British Engineering Manager of the Robins Conveying Belt Company) was unable to be present, as originally arranged, and Mr. Hampton gave the talk in his stead.

In his opening remarks, Mr. Hampton said most people thought, from the appearance of a conveyor, it was the simplest device which could be designed; but in reality this was not so. There were all kinds of conveyor belts on the market, and it was the putting together of the various unit parts—in such a way that the conveyor would be satisfactory in all respects in operation—which required vast experience. The belt was the most costly part, and was subjected to the greatest wear. In these days no one would put in a flat belt for coal or coke, for the simple reason that it was possible to get only about one-third of the capacity which was obtainable with a troughed belt. A conveyor belt had to be designed for the commodity which it had to carry, and for the conditions under which it had to operate. For instance, the abrasive action of coke was very much more severe than that of coal. In order to have a successful conveyor, it was necessary, in the first place, that there should be a well-balanced belt; but other conditions must also be complied with.

The item next in importance to the design of the conveyor was the feeding device through which the material reached the belt. It was absolutely essential to deliver the material on to the belt centrally, and it must also be projected on to the belt in the direction in which the conveyor was running. The maximum efficiency could not be secured unless the material was fed constantly and evenly on to a belt conveyor. As far as coke handling was concerned, coke, of course, was very light and, as he had already remarked, very abrasive; it was also extremely friable. Coke could not be handled satisfactorily on a belt conveyor if the conveyor was run very fast; one was limited in this respect because of the breakage. So as to keep the breakage down to a minimum, it was seldom advisable to run such a conveyor with coke at more than 150 ft. to 200 ft. per minute. With coal, on the other hand, one could go up to 600 ft., depending upon the size and the width of the belt. A 54-in. belt conveyor was going in at Beckton, which would run at 600 ft. per minute, and carry 2000 tons of coal an

hour. This could only be accomplished by concentrating on various details he had mentioned. Coal, however, was one of the nicest materials to haul on belts, because it was likely to do very little damage in any circumstances.

In connection with bye-product coke-oven plants in America, the coal was nearly always pulverized. The coal was taken from the storage—all coal went into storage over there—and was then passed through a breaker, from which it generally went into a small storage bin. In the States they had to mix their coals; and in order to get good coke it was necessary that this mixing should be done very carefully. Under the bins referred to, would be found belt conveyors which automatically stopped the plant when the coal from any point ran short. After the mixed coal had been through the pulverizing apparatus, it was carried on a conveyor to the usual storage bin over the ovens. Of course, conditions in America in some respects were very different from what they were in this country. Mr. Hampton referred to Robins belt conveyors, carrying coke still retaining a good deal of heat, and giving an average service of 500,000 tons on a 36-in. belt. In screening materials, he went on to say, it was very necessary to do so in a constant flow; and one of the advantages of the belt conveyor in connection with coke screening was that it always gave a constant and even flow, a factor which invariably tended to efficient results.

The excellent bioscope pictures illustrated large installations of various types, including some gas-company plants, for unloading and reclaiming coal from storage. Attention was drawn to one case in which a capacity had been reached of 400 tons an hour with a 3½-ton grab. There were also seen skips wonderfully designed for the completely automatic loading and unloading of material.

At the close of the lecture, the President (Mr. Walter Grogono, of Fulham) said he had been amazed at the size of some of the installations illustrated. The lecturer had given them a great deal of information, but he had not mentioned the lifetime of these belt conveyors, and it would be interesting to hear this. He believed he was right in saying it was practically the perishing time of the rubber. Were the shoots for feeding the material lined in any way, so that, instead of wearing out the shoot, one would wear out the lining?

Mr. Edwards, who added some personal impressions of his own, gathered while inspecting some of the plants in America, said the lining of the shoots interested him very much, and, particularly in connection with the handling of coke, quite a lot of attention was at present being paid to it. There was certainly something to be said for the careful lining of shoots, but he thought they had even yet got to find the ideal substance for the purpose. Where much wear occurred, it was no doubt advisable to put in removable linings of some kind. While in the States, he visited the works of the Rochester Gas Company, where, from a very large installation of vertical retorts the coke was discharged into a quenching car which dealt with about 3½ tons. There was no inconvenience from having this coke car beneath the retorts. On leaving the retort-house, the car was taken to the quenching tower, where it was sprayed with water, and then the coke was discharged on to a wharf. He should say that the maintenance cost of such a system was almost negligible as compared with the plant found in an ordinary retort-house in this country. Altogether it seemed to him to be a method of coke handling worth considering, particularly in connection with vertical retorts.

On the proposition of Mr. D. C. CROSS, seconded by Mr. LEONARD LACEY, a hearty vote of thanks was accorded to the lecturer, and also to Mr. Walker for operating the cinematograph.

Replying to points raised, Mr. Hampton said he had had no experience of the use of steel-belt conveyors, but one disadvantage he would associate with them would be the possibility of causing grave personal injury in the event of the belt breaking. The tendency now with regard to handling coke was, wherever practicable, to avoid using shoots. Until a material could be discovered that would successfully resist the abrasiveness of coke, it was advisable to adopt this course; but where necessary they did use liner plates. The lifetime of belts depended entirely upon the conditions under which the conveyor was working. The larger the belt, the longer the life; this might be taken as the general rule.

A British Firm's Work in Canada.

Montreal will have the largest gas-producing plant in Canada when the work, at present in progress, of doubling the Lasalle plant of the Montreal Light, Heat, and Power Company is completed. Originally intended to be a plant with a storage capacity of 12 million c.ft. per day, when projects now in hand have been carried through it will store 40 million c.ft. of gas. The main feature of the present work is the building of a 6 million c.ft. holder. This has been constructed in England by Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees, and is being assembled in Canada under the direction of this firm's engineers. In addition to this huge gasholder, the Montreal Light, Heat, and Power Company are at present installing an 8 million c.ft. water-gas plant. The latter will be ready for use by next August, and the gasholder will be completed by next September.

THE BRITISH INDUSTRIES FAIR.

London Section.

The exhibits at the British Industries Fair, which was opened at the White City on April 28, are proof, as usual, of the excellent organization of this exhibition. Most of the display is not relevant to the gas industry, or indeed to industrial processes in general, for the Birmingham section of the Fair deals with the heavy engineering and industrial work, while the exhibits at the White City relate to the lighter trades. We will therefore confine ourselves to a brief description of the few demonstrations of interest to the gas industry.

SCIENTIFIC INSTRUMENTS.

The Powell Thermometer Company are exhibiting a wide range of laboratory and industrial thermometers and hydrometers. Of considerable interest is their syphon hydrometer, which is particularly applicable to the sampling and testing of tanks of acid, ammoniacal liquor, &c. This simple instrument comprises an indiarubber suction bulb which draws the liquid, the specific gravity of which it is desired to determine, into a cylinder containing a small hydrometer. A universal hydrometer is shown which is capable of testing specific gravities ranging from 0·700 to 2·00. There is a totally-enclosed thermo-couple pyrometer suitable for inserting in waste-gas flues, &c.; and a wide range of industrial thermometers for boiler work forms an interesting section of this firm's exhibit. Messrs. Short and Mason, Ltd., have many useful scientific instruments on their stand. Among these, mention may be made of a gas-pressure recorder which works on the principle of the aneroid barometer, and is, we understand highly efficient in action, and a recording hydrograph having two exposed laminas, one covered with silk wicking leading to the water reservoir, and each actuating its own pen recording respectively the wet and dry temperatures. With regard to thermographs, a recording thermometer having bi metallic coils, which have proved to be more satisfactory than liquid thermostats, has been designed, and is shown by, this firm. Messrs. Brown and Sons, of Wedmore Street, London, N. 19, demonstrate a series of gas-heated stills and ovens for laboratory use. The "Chemist's" still, it is stated, produces distilled water at the cost of 1d. per gallon when the price of gas is 4s. per 1000 c.ft. A combination consisting of a still, oven, and evaporating pan has been specially designed for research laboratories, &c., where small drying and concentrating operations are numerous and frequent. The top, forming the evaporating bath, is fitted with five openings of a diameter of 2½ in., eight openings fitted with concentric rings varying in diameter from 8 in. to 2 in., a shallow sandbath 4 in. in diameter, and three conical openings for drying funnels containing filters, &c. The still head is capable of an hourly production of 7 pints of distilled water. This is a most useful apparatus for general laboratory practice.

CHEMICALS.

Among the exhibits of heavy chemicals, that of the fertilizer manufactured by the Stockton-on-Tees Chemical Works, Ltd., and known as the Pease "N.P.K." fertilizer is of particular interest. Many forms of this chemical manure are shown, some of which are made from sewage sludge, others of which peat is the base; the ammonia and phosphoric acid in all cases being in the form of ammonium phosphate, and the nitrogen in an insoluble organic form. Foreign buyers will be interested in the concentrated variety, which largely reduces freight charges. This has the following percentage composition: NH_3 18·7, P_2O_5 43·0, and organic nitrogen 0·3. From this composition the fertilizer ranges down to: NH_3 4·9, P_2O_5 15·3, N_2 0·9, and K_2O 3·3. Many other products, such as barium carbonate and chloride, ferric chloride, oxide of iron, and sodium sulphite are shown. Antimony sulphides of various shades are exhibited by Messrs. Typke and King, Ltd., a firm well known for their rubber chemicals. The Powell-Duffryn Steam Coal Company, Ltd., have a comprehensive display of bye-products, including naphthalene salts, solvent and heavy naphtha, anthracene oil, paste, and crystals, dehydrated tar, creosote oil and salts, benzole, sulphate of ammonia, coal tar pitch, and sulphuric acid. The Marley Hill Chemical Company are responsible for a similar stand, but make a feature of their coke nuts for domestic consumption.

THE GLASS DISPLAY.

As usual the section devoted to glassware of all kinds is of great interest. Chemical and illuminating glassware is shown by Messrs. Duroglass, Ltd., the Edinburgh and Leith Flint Glass Works, Messrs. Molineux Webb, and Co., Ltd., the Stourbridge Glass Company, Ltd., Messrs. John Dowell and Sons, Ltd., and Messrs. John Moncrieff, Ltd. The stand of the latter firm showed a wide range of excellent quality and workmanship. Particularly noticeable were the nested beakers of tall and squat shapes, from the smallest to the largest sizes, and the 5-litre flasks. All the glassware was free from cord and airballs and the distribution of glass was remarkably equal even in the largest sizes. Another feature of the exhibit was the glass tubing comprising soft soda, non-alkaline, resistance, and combustion. The beakers and flasks are well known for heat-resisting properties, and have a long life under working conditions. The soft-soda tubing is excellent for lamp work, and the firm make a special feature of regularity in dimension and thickness of wall. The combustion glass has now earned a world-wide reputation, and has the additional advantage of being suitable for working at the lamp.

"B.C.G.A." SOUTH-WESTERN DISTRICT CONFERENCE.

A SUCCESSFUL GATHERING AT EXMOUTH.

In attending the periodical District Conferences arranged by the British Commercial Gas Association, one cannot fail to be struck by the good judgment exercised in the selection of the towns in which to hold the meetings. Accessibility from as wide a surrounding area as possible is, of course, an important consideration; and equally necessary is it that the centre chosen should be served by a "live" gas undertaking. Besides fully meeting these two requirements, Exmouth, where a South-Western District Conference was held last Friday, possesses many other advantages—including great natural beauty—which were highly appreciated by all who were fortunate enough to be at the Royal Beacon Hotel, where the proceedings took place. Mr. J. H. Ellis (the Chairman of the Plymouth and Stonehouse Gas Light and Coke Company, and prospective President of the British Commercial Gas Association) ably presided over the conference; while the Exmouth Gas Company—who were represented by the Rev. C. R. Carr, M.A. (the Chairman of Directors) and Mr. W. E. Dean (the Engineer and Manager)—were perfect hosts. At the close there was but one opinion expressed, which was that the conference (comprising a business session in the morning and a public meeting in the afternoon) had been a success in every way. The Exmouth Gas Company gave the visitors a good day, most efficiently organized; and the visitors found satisfaction in the reflection that the Company will reap the reward of their enterprise. Highly valuable to any undertaking, a conference of this character, focussing local attention on gas, must prove particularly beneficial in the case of the smaller ones, whose opportunities of "making a stir" are necessarily more circumscribed.

The Exmouth Gas Company.

Prior to the conference, those who had arrived in Exmouth over night accompanied Mr. Dean to the gas-works, which were found to be a model of tidiness and efficiency. Therein they are in harmony with the town, for Exmouth itself is a pattern of cleanliness and orderliness. In the main thoroughfare the Company have a showroom such as becomes a prosperous gas undertaking; but even this does not satisfy Mr. Dean and his Board, for alterations are in contemplation with a view to giving additional attractiveness to the window displays. There is no idea on the part of the Exmouth Gas Company of following behind in the race; on the contrary, the administrators of the business are continually looking ahead. This is essential because the town is developing considerably, and, what is still more important, it is becoming largely a residential place. Both the Directors and Mr. Dean will find ample scope for increasing exercise of the energy and the enterprise which it is abundantly clear they possess. The make of gas is now 100 million c.ft. per annum, and last year's 5 p.ct. increase will soon be left far behind. The gross price at present is 10½d. per therm for 500 B.Th.U. gas. One other thing upon which the Company are to be congratulated is their cordial relations with the local authorities—a valuable asset to any gas undertaking.

The Chairman's Welcome.

The Rev. C. R. Carr, M.A., said it was his pleasant duty, on behalf of himself and his fellow Directors of the Exmouth Gas Company, to extend to the delegates a very hearty welcome. He hoped that the conference would be of assistance to them all, and that their visit to the town would prove in every way enjoyable. Without taking up more of their time, he would ask Mr. J. H. Ellis, who was so well known to them as the Chairman of the Plymouth and Stonehouse Gas Light and Coke Company, to take the chair.

Mr. Ellis's Opening Address.

The President remarked that he had, in the first place, to thank Mr. Carr and his co-Directors for the cordiality of the welcome offered to the British Commercial Gas Association. It was a matter of great regret that the Association's Executive Chairman, Mr. F. W. Goodenough, was not with them, for he was, as they knew, a past-master in the art of public speaking and gas administration. They also knew that Mr. Goodenough was a Devonian, and that he suffered as profound a disappointment as did those at the meeting that he was not with them in his native county. But their sense of disappointment at his absence was somewhat softened by the knowledge that it was public duty on behalf of the gas industry which kept him in London; and they would find, when they took up their newspapers on the following day, that none of them would have wished him at Exmouth when they learned how he was actually engaged. It would, he believed, transpire that Mr. Goodenough was doing his best to entertain their Majesties the King and Queen, who were visiting Wembley, and, among other things, the great exhibit there which Mr. Goodenough had organized after Herculean work on behalf of the gas industry. [Applause.]

Having said this, he would address himself to the business of the meeting. The Exmouth Gas Company represented in this favoured locality the public service of lighting, which had its inception in the fertile brain of a great genius. No doubt the bright sky and the healthy and beautiful environment of his Cornish home inspired him, as well as his desire for discovery for discovery's sake, and also his desire to benefit his fellow-men. The public service of lighting was what the gas industry was first formed for; and he made bold to say that gas for open-air lighting was to-day the most efficient and the most economical artificial illuminant. If anyone felt inclined to doubt this, let him go to that great display of imperial effort and accomplishment at Wembley, where he would find some magnificent outside lighting done by gas. They would, of course, all go to Wembley, and when they did so they would appreciate the work of their absent friend Mr. Goodenough. It had been a great pleasure the previous night to walk along the Exmouth promenade and see how excellently it was lighted by gas. But, though lighting was the first object for which gas had been introduced, it had now ceased to be one of the main purposes, which were the supply of heat and power. These were the lines upon which they must proceed, and they would only proceed successfully if they were able to benefit mankind. He put the matter on the highest ground because, unless they were able substantially to benefit their fellow-men, they ought not to succeed. They had succeeded, however, and they would succeed; for after a hundred years they were still "going strong."

On the previous day he had left London buried in fog. He did not think there were any other three letters in the English alphabet which spelt so much misery. Fog blotted out with its murky pall the pure light of heaven. It wasted people's time and money, and it spread dirt, disease, and death—and death in a far larger measure than was generally supposed. But fog was far less dense now than was the case years ago—and why? Because gas-fires and gas-cookers, which in former times were unknown, had now to so great an extent superseded the wasteful and air-polluting coal fires. As these cleanly devices, and gas-engines, replaced existing appliances for the consumption of raw coal, so would fogs diminish in their intensity; and with these lessened fogs would come greater opportunities for enjoying life. Having said so much about fogs, he felt he should refer to the reason why they met in such favoured towns as Exmouth. It was that they might know the difference between towns which did their business properly and those which, from one cause or another, could not do it so efficiently. Why did people come to this glorious place? They came because its stock-in-trade was its pure air, its beautiful environment, and its altogether charming outlook, coupled with the facilities it offered for healthy recreation. These were reasons why people left busy towns and came to places like Exmouth; and it was the mission of those in such places to send a message to the people in the less-favoured towns in order that they might emulate the example thus offered. So far as smoke abatement was concerned, the gas industry had done more than any of the inefficient legislation which in his time had been passed with that object. It had done much, and it would do yet more, to prevent the spread of disease. Doctors would tell them that one of the most fertile causes of chest diseases was a vitiated and fog-laden atmosphere. The gas industry had a high mission to perform in assisting fellow-men to live more comfortable and more healthy lives.

They would not have been meeting there that day, but for what the gas industry did in time of war. That great scientist, the late Lord Moulton, declared that the war could not have been won without the help of this essentially peaceful industry. This was an eloquent passage, and it was true. Again, they all knew that the gas industry wasted nothing of what was in the coal. From a ton of coal, they got about 20s. worth of coke, 3s. worth of tar, and 1s. worth of sulphate of ammonia. Besides the prevention of waste, all this went a long way towards paying the cost of the coal and giving people cheap gas. How highly desirable it was to encourage this way of dealing with coal! The tar made perfect roads; and smiling and fertile as Devon was, they were all aware that it could be made still more so by the use of a salt produced by the gas industry, and that it was better for the farmer to have this, which was at his door, than to bring another (and not so good) fertilizer hundreds of miles across the sea.

He had been delighted, on going to his room in that hotel, to find there a prepayment gas-meter. In large numbers of well-regulated hotels and apartment houses this was now the sole

means of obtaining a supply of heat, and it was becoming a common practice for people, when engaging rooms, to ask if such a meter and gas supply were provided. This was a line of business which the gas industry ought to foster. A coal fire in a hotel bed or sitting room might cost 1s. 6d. or more, and it was a long time before one got it; whereas, where a gas-fire and prepayment meter were installed, the possessor of a shilling and a match need not wait for any one, and the profit was far more easily secured by the hotel or boarding-house proprietor. Again as to the comfort and convenience afforded by gas, he might point out that at Wembley the world-famed caterers cooked by gas; and in this and other ways the supply of gas to Wembley exceeded 500,000 c.ft. a day, or more than a day's total output at Exmouth. Elsewhere Messrs. Lyons consumed enormous quantities of gas, and they would not do this were it not the most economical method.

In connection with his own undertaking, they had endeavoured to bring home to the public the idea that they were out to serve them; and in proportion as they did serve them, so they themselves were benefited. They had a staff specially engaged in covering the district. Already they had gone over the whole of the Company's area once, and now they were doing so a second time. It was their intention to keep on going round, to discover any possible defects, and point out how gas could be used to the best advantage. This had been going on, with the assistance of his friends Mr. Hoyte and Mr. Bolton, for some considerable time, and he personally made it his duty to see the staff every Monday morning, and learn what they had done. It might surprise the meeting to hear that the Company had in two years doubled their output of appliances. Let them all proceed on these lines, and earn from their countrymen the praise which would be their due if they successfully combated disease and efficiently provided for the requirements of their customers at an economical rate.

He would now give place to their friend Mr. Mason, the Manager of the British Commercial Gas Association, who was an excellent substitute for their other friend Mr. Goodenough.

The Work of the National Bodies on Behalf of the Industry.

Mr. W. M. Mason remarked that nobody in the room was more disappointed than he himself at Mr. Goodenough's inability to be present, for he, as no one else, could make statements such as the present occasion called for. It had been his intention to open a discussion on "The Gas Industry as a Public Service," with a reference to the work of the national bodies on behalf of the industry. Now, these national bodies consisted of the Institution of Gas Engineers, the National Gas Council, and the British Commercial Gas Association. These three bodies were linked together by what was known as the "united subscriptions"—and not only by way of subscription, but in their national work. The Institution stood mainly for research, so far as national contributions were concerned. He had been asked why so much was spent upon research. It was an extraordinary question, but it was put in all sincerity, and he had had to answer it. A more usual query was why so little was spent on research in the industry. With the capital of the gas industry, it ought to be spending, if properly conducting its business, infinitely more than was spent. While some of those present knew all about the national work, there were still in all the districts a large number of men connected with the industry who had to learn a great deal about what was being done for the industry by these national organizations. In connection with research, let them take, for example, the work of the Life of Gas-Meters Committee and the special inquiry into refractory materials. What would it have cost an individual undertaking to do all this? No single engineer could spare the time or possess the necessary experience to carry out research work as it was done at Leeds University by skilled and specialized men engaged entirely on the work. Of course, every engineer recognized the enormous value of machinery set up for doing such work as the National Gas Council were accomplishing. But sometimes directors grumbled at subscribing to such work, and required to be told in the right spirit that it was necessary, and that each individual undertaking throughout the length and breadth of the country was profiting from that work in a way that these directors did not realize. In fact, from the point of view of defence the National Gas Council was indispensable. The majority of those present knew what the "B.C.G.A." stood for. Some ten years ago many of the leaders of the industry recognized that, just as co-operative action was necessary for defence, so it was essential as far as development was concerned, and the result was the formation of the "B.C.G.A."

These conferences were valuable as giving opportunities for criticism, or for hearing something of what was being done by these national Associations, as well as for discussing live subjects such as the one they had before them that morning. He had been told that there were far too many meetings; but when looking over the reports of the proceedings in the "Gas Journal," or anywhere else, had they ever considered what meetings they would like to have cut out, what meetings the gas industry could afford to do without? He would give them an illustration, which had particular reference to the South-Western District. The President had referred to the wonderful gas exhibit at Wembley. Now, eighteen months ago there was a meeting in the Board Room at Grosvenor Gardens, when the question of whether the industry should be represented at Wembley was first discussed. There was no great enthusiasm, for it was recognized that unless something like £70,000 to £100,000 could be put-up the effort would be wasted; but one man present, who was from this district, said: "My Board, although we are 150 miles from London, consider that we cannot afford to be out of Wembley," and this lead was taken up, with the result that they now had a magnificent exhibit of which the whole industry might feel justly proud. This showed the value of having a man at a meeting to give a lead on such a point. There was no doubt whatever of the value of meetings, not only in London, but in all parts of the country, and they should be grateful to the men who, very often at much inconvenience, left their ordinary work to take part in these deliberations.

The question was recently asked in one of the technical papers—not the "Gas Journal"—"What is the value of all the conferences that the 'B.C.G.A.' organize?" It was very easy to say that there were too many of these conferences; but the answer was that they formed excellent tags for local publicity. This was nothing to be ashamed of, because publicity in the best sense was the educating of the people to a knowledge of the service that the gas industry was able to give. The President had already referred to this great fact. Why were London, Manchester, and some of those horrible towns in the Midlands or Staffordshire, not like Exmouth? Because they believed—and they said in Yorkshire quite plainly—that "Where there is muck there is money." The gas industry put it: "Where there is muck there is money wasted." The public needed to know the great service that the gas industry could render in purifying the air, and these conferences undoubtedly assisted towards that end. The Association found from experience that the Press were always willing to publish things that were worth reading—such as the service that gas was able to give—if they were put to them in the right way.

The big question of policy that the "B.C.G.A." stood for was the policy of advertising—of publicity. A large amount of money was spent in this way, though not nearly enough, as was recognized by Mr. Goodenough and those of them who had to turn-down propositions which would be profitable to the gas industry if they could only enter into them. They could spend to advantage several times the £40,000 that was now being expended upon publicity. Subscribers might reflect that they sent a lot of money up to the central fund, and wonder, in the first place, whether they could not spend it better themselves, and secondly whether it was really worth while spending it at all. It was not a question of spending money either nationally or locally, but of spending it both ways. Local publicity must supplement national publicity. The "B.C.G.A." were a national organization for publicity, forming a big pool to which gas undertakings all over the country contributed; and with this pool it was possible to accomplish things in the advertising line that no single undertaking—no matter how large—could ever attempt to do for itself. But it also meant that the undertakings locally had to help themselves by drawing attention to the service they were prepared to give—thus securing the utmost benefit from the national scheme of publicity.

He had before him one of the current advertisements of the Exhibition, which he thought put very effectively the whole reason for the gas exhibit, as well as for Wembley itself: "The Exhibition is the Empire's proof of her faith in herself." And the gas exhibit was the proof of the gas industry's faith in itself. The one other thing he wanted to say about Wembley was that there again, just as in the case of the national "B.C.G.A." publicity, so with the Wembley publicity, to make the most of a splendid publicity opportunity they must refer to the Wembley gas exhibit in their local advertisements, as well as make free use of the posters, bills, and special leaflets provided for this purpose by the Exhibit Committee. This would lead their consumers, whenever they decided to go to Wembley, to think instinctively that they were going to see gas there.

Engineers were not invariably so alive to the necessity for pushing the sales side as they were to the need of having thoroughly efficient works, but one was as absolutely essential as the other. Recently Sir Edward Marshall Hall, K.C., remarked: "It does not matter how much you spend in advertising. It all comes back to you with interest if you have a good thing to sell." This was a very wise statement. Again, Sir Harold Mackintosh, the son of the famous "Toffee King," as he was called, said that, although his firm's advertising charges ran into six figures in a year, the percentage of their selling costs to-day was much less than 25 years ago, when they were spending only a few pounds. This was for one firm selling toffee, and the gas industry spent between £30,000 and £40,000 a year. People did not advertise because it was nice to see their names in the papers. They did it because it paid every time, and it paid in the gas industry, not only nationally, but locally. There were still in that district some non-subscribers to the "B.C.G.A.," and there were also one or two non-subscribers to the Wembley Fund, though it was gratifying to be able to say that the South-Western District gave actually 100 p.ct. of the suggested subscriptions for the area. He was, however, not going to plead for subscriptions at that meeting.

A Telegram and a Reply.

The President said the following telegram had been received:

"Greatly regret absence, but you know what other duty has kept me here. Wish south-west gas undertakings all prosperity, and a most successful conference.—Devonian Goodenough."

It was resolved to wire this reply:

"South-western members in conference much regret your absence, but understand your good reasons. We wish you all suc-

cess, and offer you our grateful thanks for your splendid work on behalf of our industry."

The President then called upon Mr. Dean to read his paper.

LINKING LOCAL WITH NATIONAL SERVICE.

By W. E. Dean, Engineer and Manager of the Exmouth Gas Company.

The national service carried on by the "B.C.G.A." on behalf of the gas industry is well known, at least so far as general principles are concerned, although restatement of the case, as well as fresh consideration of the need for sustained propaganda, is necessary. My particular object, however, is to try to indicate methods—ordinary, perhaps, but nevertheless essential—which in my opinion are necessary if individual undertakings throughout the country are to obtain benefits which they should, and can, obtain from the national work which is so efficiently being carried on.

I fear that some of us have a hazy idea that the national propaganda work is in the nature of a fairy wand which will, in itself, work wonders in the way of producing increased output of gas without co-operative effort on our part. The facts, however, are that only those undertakings which practise and encourage local salesmanship methods, backed broadly, of course, by wise progressive policy, will reap the full benefit from national expenditure. The manager who connects up his individual company with the national "broadcast" publicity by means of local advertising, as well as the other essentials in what constitutes good service, will profit far more in proportion than the man who is content to let business come to him without serious and sustained effort to direct and stimulate it. We hear a good deal these days, but not too much, regarding the necessity for service. There must always be ideals behind the best service. These, however, must be translated into practical opportunities for developing business by the adoption of sane and fair business relations with our customers. Profits will, undoubtedly, continue to be made in the retort-house, but not there only. The modern gas manager's duties must cover much more than the economical production of gas of regular quality and the supplying of it at constant pressure, though these are essential to ideal service. Keen, and in many ways unscrupulous, competition makes it imperative that practical salesmanship methods should be inaugurated and continually in operation if a gas undertaking is to progress as it should. We cannot stand still; if we do not progress, we are bound to lose ground. Management, in its truest sense, consists of directing the human element, of training the workers in their tasks, encouraging initiative, recognizing ingenuity, rewarding effective effort, and enlisting the hearty support and thorough co-operation of each individual in the organization—or getting, in a word, a strong pull together in rousing the interest of gas consumers and in satisfying their requirements.

The creation of goodwill by the rendering of good service is one of the most valuable assets of a gas undertaking. Goodwill cannot be built up in a day, but can only be the outcome of persistent, conscientious, and faithful work, with an ideal behind of trying to give the consumer what has rightly been called "a square deal." A monopoly such as a public gas supply has serious dangers, if it is looked upon as simply a means for getting the most and giving the least. Viewed from the standpoint of a public utility service with endless helpfulness to the whole community, the potentialities of the industry are enormous. This is continually being demonstrated by the increased sales of gas which most undertakings are recording. Large and small are enjoying the benefits of the progressive movement, and it is hoped that no effort will be spared to keep pace with the demands which are likely to be made upon us in the future. One very simple illustration of this will appeal to you all. In some undertakings it is stated that they receive practically no complaints from their districts. This, however, may indicate that consumers are so tired of reporting trouble and having nothing done that they get into a state of hopelessness or indifference in the matter. If the complaints counter is converted into a Public Service Department with a spirit of goodwill behind it and the welcoming of any information on the part of the consumers whereby their apparatus may be brought into efficient order, good results will follow. "That the customer is always right" is a definite policy on which (with, of course, other essentials) many big business houses have been successfully built.

The question of free maintenance of apparatus has recently been receiving considerable attention, and it is a matter which should claim our prompt attention, as there is not the least doubt that gas consumers generally are satisfied or content with a low standard of efficiency. We have, in the past, been too reluctant to scrap old and worn-out apparatus on our districts to the same extent as we do on the works. I suppose that is because in one case we always have it before our eyes, and in the other case we do not see it unless our attention is particularly drawn to it. This should not be, as it is just as essential to keep up the efficiency of the gas-consuming apparatus as it is of that which plays its part on the manufacturing side. I remember reading the account, given by Mr. Bloor of York, at a District Conference of this Association, of the excellent work he was doing in connection with the systematic inspection of gas apparatus. His statement of the line of thought leading up to the inauguration of his system of inspection is, I think, conclusive evidence of the need for the work:

(1) It is an ascertained fact that consumers generally are unable or unwilling to keep their own installations in order.
(2) Consumers cannot be relied upon to notify the gas undertaking when appliances fall below a maintenance standard of performance.
(3) The current idea of the efficiency of gas service is low, even on the part of consumers who officially "have no complaints."
(4) Every piece of apparatus giving indifferent service is a danger to the future of gas, to whatsoever cause the inefficiency is due.

Taking the first case. We find in our every-day business that most consumers have not the inclination or the expert knowledge to adjust their apparatus, and in consequence prefer to put up with indifferent service rather than come to the office and voice their complaints; and our experience in this town is that we get the bulk of complaints coming in when the consumers pay their accounts. This indicates generally that the consumer is indifferent as to whether his cooker or fire, or whatever apparatus he may have in use, is giving him the best results, until he happens to have the opportunity which his visit to the showroom affords him of voicing his complaint. Granted the premises, Mr. Bloor said: It is hard to avoid the conclusion that a change in existing methods of selling gas is called for; the alternative of changing human nature being beyond the scope of our business. The average consumer does not know what a clean, healthy, comfortable, convenient, and efficient servant gas is when consumed in a properly regulated piece of apparatus. Too often, with inefficient and worn-out apparatus, only a caricature of service is secured. The idea of the satisfied consumer being the ideal may very easily be a delusion, and there is little doubt that some system of periodical supervision is necessary, when the tuning-up of apparatus is undertaken, as well as the cleaning of apparatus and renewal of the faulty and broken parts, and so on.

The state of affairs which would be revealed by an examination of gas-consuming apparatus on a district would, I think, astonish most of us. At York it was found that of the 21,000 consumers in that city, some 1260 persons had an insufficient supply of gas to their premises, owing to services being small or partly blocked. As another instance, it was found that in 1680 establishments there were appliances giving service, but not up to the consumers' own ideas of satisfaction. Viewed another way, there were nearly 3000 persons potential grumblers about the gas company. Investigations in both Glasgow and Tunbridge Wells confirmed the experience at York, and I feel certain we should find a similar state of affairs existing in our respective undertakings, were we to look for it. It is my intention to proceed with the work of investigation, as I feel convinced that much of the apparatus on our district needs periodical attention—perhaps a more drastic method known as scrapping. It is only by these means that we shall secure the goodwill of the consumers; and I am firmly of opinion that, though the cost will be greater than before, both parties will benefit in the long run. I think, perhaps, I should mention that the places referred to—York, Glasgow, and Tunbridge Wells—already had a forward policy as regards public service; and while most of us think we are doing our best, we should probably be astonished if the complaints came in *en bloc*.

Not only would this inspection work create better business relations with consumers, but would provide excellent opportunities for making further sales. To increase the gas consumption to existing consumers is the most valuable business to obtain, and it appears to me that there is still plenty of scope for development in this branch of our business. Maintenance work of the kind just referred to should surely be included in the price of gas, and not be an extra tax on individual consumers. It is undoubtedly to the best interest of the gas undertaking that the very highest efficiency should be given for a minimum consumption.

Incidentally this is one of the most valuable points in connection with showrooms. If for no other reason than the demonstration to the public of what gas is capable of doing in ordinary circumstances, a good showroom is essential. There is no need to have a flashy establishment, but a good serviceable place in keeping with the best shopping standard of the town, clean and up-to-date, and with a regular change of window displays to attract and educate the public, is one of the essential links between local and national service. Advertising in the local newspapers is also essential. The service that the "B.C.G.A." is in a position to give as regards the supply of blocks and copy, has removed what was a serious difficulty, as the gas manager of to-day, with so many and varied calls upon him, finds it impossible to devote the time necessary for the compilation of advertisements which can be so much more effectively produced by those who are expert in this particular business. Furthermore, supporting the local press and keeping on the best terms with the editors of local and district newspapers will be found of the utmost use. Newspapers exist for the distribution of news and the publication of advertisements; and if the editors cannot get properly set-out facts about any controversial matter or subject of public interest, they are almost certain to copy from some other paper or publish erroneous or one-sided statements which may not always be to the liking of the local gas undertaking. If, however, they can rely on getting the facts of the case from the manager of the gas undertaking, it will be found that they are generally only too pleased to publish them. If the local gas undertaking is a regular customer in their advertisement columns, friendly relationships will be all the more easily established and maintained.

In the summarizing of my remarks, I have not attempted to cover anything like the whole ground for local sales development, but have confined myself to three essential links in the local effort to join-up with the national propaganda. These essentials in the building-up of service may be summarized thus:

(1) The deliberate building-up of goodwill in the industry.
(2) The establishment and maintenance of first-class showrooms.
(3) Local publicity.

The last item, of course, must include, besides newspaper advertising, the distribution of literature designed to educate the consumer in the use of gas, as well as to remove prejudice and ignorance as to what gas service really stands for. I have not attempted to go into the branches of local service. This can best be dealt with by each undertaking according to the circumstances and conditions existing in its own town; but I think lectures, cookery demonstrations, and periodical exhibitions may be included, especially in the larger towns where convenient buildings are available for such purposes. The great exhibition at Wembley is, as the Prince of Wales so happily put it, "The shop window of the Empire." The gas exhibit there will, we all believe, be a splendid shop-window for our industry, and we shall do well to remember that in our individual cases our local service will make or mar the impression created in our own particular districts.

This is a very brief, and I fear far from complete, statement on an interesting subject; but I trust some of the points indicated will suggest lines of discussion helpful to us all.

Discussion.

The PRESIDENT said he was sure it would be their wish to extend to Mr. Dean a hearty vote of thanks for his valuable paper. It showed true wisdom and great efficiency, but this would have been expected by those who had seen the gas-works, and who knew what Mr. Dean had done for Exmouth. He had obtained excellent results, and by increasing the output of gas had diminished enormously the capital per million cubic feet of gas sold, and rendered possible a lower price to consumers. The Company were to be congratulated upon possessing so capable an officer.

Mr. W. N. WESTLAKE (Exeter) thoroughly agreed with the compliments the President had paid Mr. Dean regarding the progress of the Exmouth Gas Company during the past eight or ten years. Personally he had rarely seen such progress as had been accomplished there in the period named—particularly bearing in mind the size of the undertaking. Such progress was a matter for sincere congratulation to the Company, and it was also of some assistance to the neighbouring undertakings. He was in entire accord with the author in what he had said on the subject of general maintenance. In Exeter they started a general maintenance system just prior to 1914, but unfortunately in the middle of the war it had to be practically dropped. A few old men were able to carry on, but in a very small way. As soon, however, as they recovered from the effects of the war, they recommenced the system, and as the result of his experience he was convinced that it had been of great benefit to the undertaking. In the first place, as Mr. Dean had pointed out, it revealed defects which the undertaking would not otherwise know of. Secondly, having discovered these defects, one secured satisfied customers instead of discontented ones. Though sometimes a discontented consumer would not come and inform the gas undertaking of the fact, it was wonderful how this dissatisfaction spread, if it were not checked. On the other hand—and this was where the joy of the work entered in—he had been able to trace the good results of looking after a consumer in a substantial increase of business. The effect of looking after one particular customer was also found to spread in a remarkable way. The question of the training of men to carry out this work was highly important, and it was a matter to which the gas industry as a whole had not paid sufficient attention in the past. It would in the immediate future be absolutely necessary to do something more than they were doing at present. If they wished to maintain apparatus in a proper manner, it was not a bit of good sending a semi-trained man to do it. The probability was that he would make things worse than they were before, and give the undertaking the reputation of not knowing its business. Of course, it was extremely difficult for the smaller concerns to undertake a task of this description. The very large ones had done it—and done it excellently—for years. Some of the more moderate sized undertakings were attempting it, and he would like to suggest to those present that they should see whether something could not be done practically in every town of medium size to afford some real training to the men who were sent out to customers to maintain apparatus. His Company had done something in this respect for the past fourteen or fifteen years, and no man was sent out on maintenance work now who had not been fully apprenticed, while the bulk of them had passed examinations. The experience obtained in sending these men out on the district had convinced him that it was the right policy, because they were getting better work done, to the benefit both of the consumer and of the undertaking.

Mr. J. W. WHIMSTER (Bath) thought they must all agree with what Mr. Dean had said in his paper with reference to the maintenance of consumers' apparatus. Unless it was maintained in a thoroughly efficient state, satisfaction could not be secured. It was a very important part of the distribution system to have a good and, as the author had remarked, clean, tidy, and up-to-date showroom. The Exmouth showroom certainly complied with these requirements. As regarded apparatus fixed, he thought that to say a town was fully saturated because there were a cooker and so many fires in every house, was not the proper way of looking at the matter. There might be nine gas-fires in a house, but on examining the gas consumption it might be found that one was in use while the other eight were unfit for service. It gave a misleading impression to regard such an installation as consisting of nine gas-fires, when in reality the consumer, realizing that eight of them were inefficient, instead of complaining, had ceased to use them. Not very long ago, his Company took a census of sixty-three nine-roomed houses in Bath, and made a note of the consumption of gas. The houses were all more or less of the same type, and the average consumption was 59,000 c.ft. per annum. The maximum per house was, however, 178,999 c.ft., while the minimum was only 13,000 c.ft. per annum. This showed what possibilities existed. Perhaps the 178,000 c.ft. might have been owing to an exceptionally large family requiring more baths, &c., but surely the average could be brought up by attending to the houses with only small consumptions. In the newer houses which had been built under the Ministry of Health, where gas-apparatus had been installed, one would think this would mean that the consumption would be approximately the same in all cases. It might have been so had they been able to convince the Ministry of Health that a gas-cooker was the thing wanted by the people, and not a coal-range of the inter-oven type; but though most of the people realized the economy of the gas-cooker, and so employed it in preference to the coal range, there were some others who, seeing the coal range was installed, used it. There were about 300 houses built, all of the same type, with gas installed throughout—cooker, geyser, wash boiler, the various lighting points, and each room arranged for a gas-fire. The consumptions in these houses varied from 15,000 to 76,000 c.ft., the average being 40,000 c.ft. The Company were investigating the matter to find out the reason for these great variations in consumption, but they had not yet got very far. In the case of the 15,000 c.ft., they found an old lady living alone, but in that of the 76,000 c.ft. there were only two in family, but they happened to have four gas-fires. Really it was a matter of educating the people as to the economy of using their gas-apparatus. Perhaps some of them had not previously been in the habit of burning gas. Without any solicitation on his part, one of the leading doctors of Bath, who ran a private hospital, and who had gas fires throughout, had written him: "You may be interested to know that, since I have instituted gas-fires throughout my house, instead of coal fires, the cost of fuel has been reduced by about one-half." Later on in the letter, he said: "I now propose to cook altogether by gas, and use a gas-stove for heating the kitchen." Evidently he had been doing some by gas and some by coal. They had had a little trouble with this consumer at first, owing to the inefficient supply on his side of the meter, but they had convinced him of the cause, and he had allowed the Company to re-pipe the house. Now he was a thoroughly satisfied consumer. All this went to show that the periodical inspection which Mr. Dean advocated was a paying proposition.

Mr. S. J. INGRAM (Truro) said that those of them who had known Mr. Dean for many years had fully expected a paper of the excellent quality of the one to which they had just listened. He had been glad to hear the author emphasize the importance of the cultivation of goodwill between the gas undertaking and the customer. For very many years gas undertakings had not enjoyed the complete goodwill of the public; but notwithstanding this, those of them who had the interests of the industry at heart had endeavoured to cultivate goodwill. But were they always prepared to exercise this goodwill in warning the customers as to apparatus? Many gas undertakings were glad enough to fix appliances without taking the opportunity of reminding the consumer that a particular piece of apparatus might involve the payment of a large gas bill at the end of the quarter. His Company gave instructions to their staff, when fixing gas appliances, to warn the customer as to what was involved—a certain sized gas-fire or gas-cooker would represent a consumption of so much gas per hour. In connection with his own particular undertaking, the value of this course had been manifested within the last six months. A customer who came to reside in their area of supply gave the Company the opportunity of recommending certain gas-fires for his bachelor establishment, and eventually they secured an order for twelve to be fitted-up in the various rooms. He was tactfully reminded that this would mean a big gas bill, but at the same time the convenience and great saving of labour were pointed out to him. When the gas bill came in, he was perfectly satisfied (though it represented a consumption of nearly 100,000 c.ft. for two months), and gave an order for further five fires to be placed in other rooms. In every bedroom there was a gas-fire, with boiling-ring attachment for hot water. Each bachelor was supposed to keep his own bedroom clean and make his own bed, and the whole establishment was run entirely by a housekeeper and her young daughter. The reduction in the household establishment rendered possible by these fires more than paid the big gas bill.

Mr. R. J. REW (Exeter) remarked that he was forced to spend a good proportion of his time in hotels, and he had frequently been struck with the terrible state into which gas-appliances there had been allowed to get, and the shockingly bad advertisement for the industry which they constituted. On the question of maintenance, the ordinary householder was not comparable with the necessity for looking after the hotel. He knew of one case in which a gas-fire was installed in a reading room, and a very fine fire it was; but the room was mostly occupied by old men, among whom there was the usual prejudice. One evening he happened to go into the room, and found the flames at least 3 in. above the top of the fuel. About a fortnight or three weeks later, there was a request by members for the fire to be removed. This illustrated the need for looking after what might be termed "the public gas-fire."

Mr. DEAN acknowledged the vote of thanks.

LUNCHEON.

The conference then adjourned for luncheon, at which a party of about seventy sat down, as the guests of the Exmouth Gas Company, with the Rev. C. R. CARR in the chair. After the honouring of the Loyal Toast,

Mr. P. S. HOYTE proposed "The Exmouth Gas Company," coupled with the name of Mr. Carr. Nearly twenty years ago, he (the speaker) and his family decided that Exmouth was a delectable spot in which to spend a holiday, and year after year they went there. As a matter of fact, fifteen years ago he was asked to report on the works, and he was responsible in 1910 for putting down a holder which was still rendering excellent service. He had also reported upon what he considered to

be the probable future development of Exmouth. This report seemed rather rosy at the time he made it, but in the light of actual events it would appear rather pessimistic. The town had developed at a far more rapid rate than he had then anticipated would be the case. Those who had had the privilege of visiting the works that morning had seen a model works. It only showed what a progressive Board of Directors and a progressive Engineer, coupled with the natural advantages of a place such as this, could accomplish for the industry. Before the war there were no showrooms, and the works badly needed modernizing, but during the war there was no undertaking in the West Country that did more than Exmouth for the good of the cause. To-day they had an excellent works and a first-class showroom.

The Chairman said that, on behalf of himself, his fellow Directors, and Mr. Dean, he thanked them most heartily for the cordial way in which they had received this toast. He believed the works really did merit all that had been said of them, and this they owed to Mr. Dean, of whose services to the Company he could not speak too highly. He (the speaker) had lived a great many years in Exmouth; the first gas bill he paid to the Company being dated early in 1871: and it was a comfort to him to hear the town so well spoken of. It was a great pleasure to him to see so many happy faces, and they were happy because they were the faces of men who were doing their best. Oh, what would England be if every man did his best! It grieved him deeply to read of the strife there was in industry in this country. The men were tools in the hands of designing aliens, who wanted to ruin England, and were on the high road to do it if the manhood of the country did not declare itself and shake itself free in some way, so that the real Englishman might have a voice in the matter, and not be at the beck and call of an international board sitting abroad.

Mr. W. N. Westlake submitted "The British Commercial Gas Association," remarking that he happened to be a member of the Executive Committee of the Association for that district, and had, as a matter of fact, been on the Executive since its formation. He therefore had had ample opportunity of appreciating the good work done. The Association actually filled a void, and undertook duties that were not being performed before, and was carrying on work without which the industry would not have occupied the position it did at the present time. When started it was supported by only 20 p.ct. of the industry, and was but a provisional organization on trial for three years. It was, however, so successful, its progress was so rapid, that it now represented in its membership 87 p.ct. of the industry. It was quite possible, of course, for an individual undertaking to present its case for service to the public in its own particular locality, but without the Association one could not get united national publicity. He wanted them to see if they could not get a 100 p.ct. membership so far at least as the South-Western District was concerned. All—subscribers and non-subscribers alike—were getting the benefit of the work carried on. Though it was a difficult thing to bring home the success of publicity, he was certain his own undertaking in Exeter had benefited tremendously by the national publicity that had been undertaken during the last ten years; and if they in Exeter had been benefited, it was only fair to say that the whole of the undertakings had been also. Again, the "B.C.G.A." always put in front of them a very high ideal of service. "United for Service" was the keynote of their appeals to the public. He coupled with the toast the name of Mr. Ellis, who was doing so much for the industry. They were all hoping to welcome Mr. Ellis shortly as the President of the Association.

Mr. J. H. Ellis, in response, said that he would not dream of taking up the onerous position referred to unless he were assured of the unanimous support of the South-Western District and of the industry generally.

Mr. W. E. Dean proposed "The Visitors," and this was replied to by Mr. R. B. Ponsford, the newly-elected Chairman of the Urban District Council, who testified to the excellent relationship which had always existed between the Gas Company and the Local Authority. He did not know that there had ever been the slightest difference of opinion.

Modern Housekeeping Made Easy.

In the afternoon, there was a public conference, at which a lecture, addressed mainly to the ladies, who had assembled in large numbers, was delivered by Miss A. D. Muncaster, F.R.G.S. (Somerville College, Oxford), Chadwick Trust Lecturer (1922). She took as her subject "Modern Housekeeping Made Easy," and all that she had to say as to the advantages of gas was followed with the keenest interest by the audience, who appeared to be in full sympathy with the views she expressed.

The President, in opening the conference, detailed his own experience of "all-gas" houses. His first quarter's gas bill rather shocked him, until he was reminded that he had one servant less than before. Then, when he reckoned the wages he would have paid this servant, and the cost of her maintenance, he found that, in spite of the gas bill, he had saved tremendously. In his next "all-gas" house, he adopted the excellent plan of having the gas-meter placed where it could be plainly seen and read daily. It was a great help always to have the meter in front of one, and to check it frequently. For seven years he had not had an ounce of coal in any house in which he had lived. Further, with the assistance of Mr. Hoyte, the excellent Engineer at Plymouth, it was decided to build an "all-gas" house for the foreman. A model of it was shown at the Ideal Home Exhibition, and attracted a good deal of notice. The man was living in this house now, and found it most economical and comfortable. To test the matter in regard to the ordinary working man, not an expert gas foreman, he (the speaker) later decided, with the assistance of the gentleman he had named, to erect two all-gas workmen's homes. They were built and sold, and were now owned by two *bonâ fide* working men.

A number of questions were asked, and, on the proposition of Mr. Mason, Miss Muncaster was heartily thanked for her lecture, and Mr. Ellis for presiding.

MIDLAND JUNIOR GAS ASSOCIATION.

Annual Meeting.

The Annual General Meeting of the Midland Junior Gas Association was held at the Council House, Birmingham, on Thursday, May 1. Mr. L. H. Thomas, the retiring President, was in the chair, and there was a representative attendance of members.

The annual report was approved without criticism, on the motion of Mr. S. W. Simmons (Dudley).

Mr. A. R. Myhill (Treasurer) submitted the statement of accounts, which he described as satisfactory. The Association was solvent, and he did not think there would be any need to ask for an increased subscription.

The Chairman stated that an announcement would be made in the next notice issued to the members, of the election of a Junior Vice-President. At the moment, a member whose name had been mentioned in this connection had not been approached.

Mr. Kenrick (Birmingham) and Mr. Hardiker (Smethwick) retired from the Council, by rotation, and Mr. W. L. S. Spinks (for Birmingham) and Mr. G. E. Burden (Redditch), as District Member, were appointed to the vacancies.

Mr. H. R. Hems, of the Research Laboratories, Birmingham, was unanimously re-elected Hon. Secretary, to whose work the Chairman paid a warm tribute.

Mr. A. R. Mybill was re-elected Hon. Treasurer, and Mr. W. P. Timbrell, Hon. Auditor; and to these gentlemen, as well as to Mr. Hems, a hearty vote of thanks was passed.

The thanks of the members were also extended to Messrs. Kenrick and Hardiker.

Mr. H. Clark, of Derby, the Senior Vice-President, automatically becomes President, in succession to Mr. L. H. Thomas; and Mr. J. H. Gee, of the Central Laboratory, Nechells Gas Works, Birmingham, Junior Vice-President, takes the position of Senior Vice-President.

This concluded the business of the annual meeting.

The Chairman, in calling upon Mr. Hems to read his paper, observed that the industrial field of the gas industry was being enlarged with great rapidity.

Mr. Hems then read a paper on

GAS-FURNACE INSTALLATIONS.

In compiling a paper on matters relating to industrial gas-apparatus, I have found difficulty in deciding on a method of approach to the question, so that my remarks may benefit those who are already dealing with industrial gas sales and those who may have to deal at any time with an industrial inquiry. I also hope that the furnace manufacturer may find something of benefit and use.

A great deal has been written on this subject, and individual types of furnaces or their applications to a particular trade have been dealt with in detail by several experts. Therefore, it will be my endeavour to place before you some facts and figures obtained over an extended period regarding a few of the many and varied types of furnaces and industrial apparatus which the manufactures of a city like Birmingham demand. It is said that everything is or can be made in Birmingham. This may be a rather tall order, but from our point of view, leaving out the specialized demands of shipbuilding trades in a city like Glasgow, and the steel demands of Sheffield, I think that we in Birmingham obtain some experience with trades and articles likely to be met with in most other towns and cities. I may revert in some instances to the element of furnace and apparatus design. This will be all to the good, as with so many new improvements it may be thought that there is now no use for the earlier types, while as a matter of fact many of these are used to-day very successfully, and cannot be adequately replaced by many of the newer designs.

In giving you the following figures of the progress of industrial or manufacturing gas consumption in Birmingham, as separate from the domestic and power load, I wish to indicate how an undertaking can be repaid for initial enterprise and continued attention to this most important and absorbingly interesting branch of our industry.

Year ended March 31.	Total Gas Sold.	Total for Industrial.	Industrial P.Ct. of Total.
	C.Ft.	C.Ft.	
1911	7,693,899,300	389,511,000	5·06
1914	9,551,783,300	793,840,400	8·31
1918	12,006,496,700	2,680,489,200	22·33
1921	11,734,970,300	2,005,839,200	17·09
1923	10,937,923,300	1,665,257,100	15·22
1924	12,017,086,400	2,057,283,000	17·12

The future development of industrial gas consumption depends on several important factors, among which may be mentioned the price of gas, the dependability of supply, the makers of apparatus, the price of apparatus, and the service rendered by gas undertakings.

Though I have mentioned the service rendered by gas undertakings last, it is of primary importance; and with a view to illustrating my statement it may interest you to have a few details of the methods of dealing with inquiries at the Birmingham Industrial Demonstration Rooms, which I believe the majority of

you have visited. The policy of the Birmingham Gas Committee in organizing these Demonstration Rooms was to provide for the manufacturers of the city centrally situated showrooms where many of the standard types of furnaces could be shown at work; and if these did not meet the need, a special furnace might be designed and erected for an experiment with a possible consumer's own materials and workmen and under practical conditions.

A prospective consumer making inquiry at the Demonstration Rooms is invited to give full details of his requirements; and where these can be met by one of the furnaces on show, the various advantages and disadvantages of this furnace for his particular work are discussed with him. The capital cost of the apparatus, with its gas consumption, as far as can be stated, for the particular work under consideration, is told to him, and, if necessary, a practical test run to obtain actual figures of gas consumption. This is not difficult, as each room is equipped with a meter with a simple index, to the supply from which each furnace shown can be easily connected. After an order has been secured and a furnace installed, a visit of a skilled man is paid to instruct a user in the adjustment and running of the furnace to obtain the best results. Later, periodical visits of inspection are also made. Another highly important part of our work is the repair service. Repairs to any make or design of furnace are undertaken and carried out in the shortest possible time with best-quality materials and at reasonable rates. This service has grown tremendously during the past two or three years, and has led to our retaining and increasing many consumptions which might have been lost owing to the inefficient working of furnace apparatus.

We are particularly fortunate in Birmingham, as the additional facilities for the Industrial Research Laboratories, including physical laboratories, chemical laboratories, with photomicrographical apparatus, &c., and heat-treatment shops, assist manufacturers and ourselves in deciding which design of gas-furnace or apparatus will be most suitable for the particular work under consideration. Photographs and details of new testing apparatus recently installed have been published, as you are aware.

Oven and Muffle Furnaces.

Coming to the main subject-matter of my paper, a large proportion of the gas consumption for industrial work is used in furnaces of the oven and muffle types, which are used so extensively in the motor-car and other trades; and I propose to deal with various types and installations of these first. For many years it has been the custom to designate anything in the nature of a gas-furnace as a "gas-muffle." It is time this ended, as it leads to many unnecessary complications. By "oven" is meant the open type of furnace with either flame or products of combustion in contact with the work placed on the working hearth, and by "muffle" we refer to the totally-enclosed type of furnace with the work brought to the required temperature by the heat radiated from the walls of a fireclay or steel shell externally heated. Oven furnaces are used extensively for annealing or softening processes at temperatures between 700° and 800° C., steel cementation in carburizing compound (900° C.), steel re-heating for quenching-out operations (780° to 900° C.), enamelling (900° C), and many other special processes. Muffle furnaces are used for the heat-treatment of precious metals, enamelling, and particular operations usually carried out by furnaces of the oven type but where freedom from contact with products of combustion is essential.

The earliest types of both these furnaces were firebrick boxes externally bound with cast-iron plates and fitted with one or more bunsen burners playing on the under part of a fireclay tray or a muffle placed within the box after removing part of the floor. Control of primary air was given by adjustment at the injector, but any quantity of secondary air might have been admitted. The oven furnace brought out by the Richmond Gas Stove and Meter Company, Ltd., was the next advance, and still meets satisfactorily many demands of the manufacturer. This furnace is fitted with special bunsen burners playing under the working hearth, and receiving a supply of secondary air from ports running from the outside of the furnace to the combustion chamber. Flue outlet is direct from the working hearth through the arch of the furnace. It is well, although not too massively, constructed, and thereby is quickly brought up to the necessary temperature—a point often of great importance in these days of shortened working hours. It is almost foolproof in its working, if instruction in the manipulation of the burners and dampers is given, and is easily repaired. This firm have also introduced improved types of oven furnace.

Two other types of oven furnace now well established with features well worthy of note are those made by the Incandescent Heat Company, of Smethwick, and Messrs. Lucas Furnaces, Ltd., of Birmingham The former firm have produced a well designed and constructed oven with bunsen burners playing horizontally into channels under the working floor, the products filling the working chamber and leaving at two ports placed one on each side of the door opening. As all products are brought to the front of the furnace, "cold door" effects are obviated. This firm also make a point of well insulating their furnace, leading to reduction of radiation losses and consequent reduction of gas consumption. Messrs. Lucas in their furnace arrange for firing either under the working floor or from the sides of the furnace under the arch, according to the work to be carried out. In either instance, all products of combustion are taken off at the front of the furnace through a port covering the whole width of, and on a level with, the working floor, and are drawn to the flue take-off through a series of recuperator tubes over the surface of which the secondary air entering the furnace is made to pass, thus taking up the heat from the waste gases and leading to an increased efficiency with a consequent economy in gas consumption.

In the "Revergen" furnace, the Davis Furnace Company, Ltd., have given us a highly efficient furnace in which temperatures up to 1700° C. can be easily obtained. In this furnace, gas is allowed to enter at ordinary pressure, and is mixed with, and carried into the working chamber by, an air supply from a fan at a pressure of 8 in. to 10 in. W.G., which has previously passed through one of the two chequer-brick regenerators placed side by side under the working hearth of the furnace. When the ignition temperature is reached in the hearth or oven, the gas and air supplies are changed over to the other side of the furnace; the air now being fed through the opposite regenerator, and the first mentioned becoming the carrier for the products of combustion on their way to the flue outlet. This change over is then carried out periodically to enable the waste heat given up to the regenerators to be taken up by the incoming air supply.

The counter-current type of regenerator furnace is typified in the furnace designed by Messrs. Gibbons, Bros., Ltd. (in collaboration with Dr. C. M. Walter, of the Birmingham Gas Department). In this instance the products of combustion leave the working hearth of the furnace at ports both at the back and front; in the former case collecting in the breeches flue and passing into a central regenerator along the furnace into the main flue, each of the front ports having separate regenerator passages connecting to the main flue. This arrangement gives three regenerators; and between these run two air regenerators separated by the thinnest firebrick walls possible, consistent with the strength needed. Thus the heat from the waste-gas flue is transferred to the incoming air. Gas is also preheated by means of two steel containers, and the furnace is highly insulated.

I will now give some details regarding actual installations of these types of furnace. The first to which I would refer is an installation of two oven furnaces of the "Richmond" type referred to, used for the annealing of brass stampings and spinnings at a temperature of 750° C. for the manufacture of motor-car lamps. During the war, these furnaces had been placed back to back and made into one long furnace in a very unsatisfactory manner, and continued to be used for peace-time products. The firm using them complained of excessive gas consumption for the output they were obtaining. It was my lot to inspect and advise their rebuilding into separate furnaces. This was done, and it is interesting to note that, since the alteration, one furnace only has been used and is dealing with practically double the former output of the two furnaces together. Another interesting fact regarding these furnaces is that the floor bed, supports, and guard tiles are made of "Carbofrax" materials, which have been in continuous use in the one furnace for a period of twelve months without showing any sign of cracking or giving way.

The next furnace is a new installation of an "Incandescent Heat Furnace;" and I give in detail a summary of the work done and the gas consumed in this furnace.

Results of Test on Oven Furnace for the Annealing of Brass Stampings and Castings.

Size of furnace	36 in. by 18 in. by 12 in.
Total period of test	8 hours
,, number of heats	28
,, gas consumed	2853 c.ft.
,, weight of work annealed (inclusive of pans)	14 cwt. 0 qrs. 4 lbs.
Gas consumed per lb. of work annealed	1·81 c.ft.
Average weight of each heat	56·14 lbs.
,, time ,,	13·46 mins.
,, temperature of work when taken out	654° C.
Average gas consumption per hour (morning)	395 c.ft.
Average gas consumption per hour (afternoon)	292 c.ft.

These figures may be taken as a standard of working for the average gas-heated oven furnace of any size up to 3 ft. long by 2 ft. wide by 1 ft. high.

The smaller types of oven furnaces, of sizes ranging from 12 in. by 9 in. working floor, are also used in very large numbers for general tool-shop heat-treatment work. The natural-draught type is recommended in a large shop where continual supplies of tools require to be hardened, but where use is only intermittent. Gas-and-air blast has in most cases to be resorted to, owing to the quick heating-up required, though the soft heating action of the low-pressure furnace is to be preferred wherever possible.

A large number of furnaces of the "Revergen" type are in use throughout the country. In Birmingham they are used for annealing processes and heat-treatment of forgings and steel parts. We also have one high-temperature furnace working daily up to a temperature of 1350° C., which is obtained with ease, and to a time-table. In fact, provision is made automatically to provide definite increases in gas consumption at stated times to attain desired temperature within those times.

Many of you would have the opportunity of inspecting an oven furnace of the Gibbons type at the National Gas Exhibition last year. It may interest you to know that during the period of the Exhibition practically 3 tons of motor-car component parts were heat-treated in this furnace. One of these furnaces has recently been installed in our wagon repair shops at the new Washwood

Heath Gas-Works for the heat-treatment of laminated wagon springs at a temperature of about 850° C. The following is a summary of an average working day's results:

Test on Oven Furnace Heating Steel Wagon Springs.

Size	7 ft. by 3 ft. by 18 in high.
Total time of working	8 hours.
,, gas consumption	8205 c.ft.
,, weight of work heat-treated	1 ton 8 cwts. 1 qr.
Average gas consumption per hour	1091·33 c.ft.
Gas consumption per lb. of work treated	2·5 c.ft.
Temperature attained	800° C.

Melting.

Probably next in importance is the gas consumed for melting metals covering a very wide range, from metals with low-melting points such as tin, lead, zinc, and aluminium to the higher melting-point metals such as brass, gunmetal, and nickel. Cast iron is also melted by gas, but in very small quantities. Melting operations can be carried out with gas at ordinary pressures; low-pressure gas, and air at pressures varying from ½ in. to 2 lbs. per sq. in.; high-pressure gas at pressures from 3 to 12 lbs. per sq. in.; and gas and air mixture systems. These various systems also apply to most industrial gas processes.

Tin, lead, and similar low-temperature metals are melted by low-pressure gas in iron pots with burners of the ring type underneath and firebrick settings arranged to the shape of the pot, the inner surface being made as rough as possible to offer a big surface to the flames and products before they reach the flue outlet. This method is satisfactory (say) up to 3 or even 5 cwt. quantities in some cases; but where larger quantities have to be dealt with, high-pressure gas or gas-and-air blast is necessary, though the design of the setting remains as before, with a possible slight reduction in the space between the outer side of the pot and the inner brick lining.

Most of you will be familiar with the standard gas-heated furnace used for brass melting. Many designs have been evolved but I think the one consisting of a firebrick setting with a circular, hole of a diameter to suit the particular size of pot, with allowance for pot tongs, and with the burner playing tangentially into this space, has yet to be surpassed for simplicity (both of use and maintenance), speed, and economy of working. This branch of industrial gas business is sufficient for a whole paper, and as at the present time we are still not in a position to sell gas at a rate to compete with other forms of fuel for brass melting, on a fuel-cost basis, I propose to leave for the moment further discussion on this point. It should be mentioned, however, that nickel and several high-melting point metals are being melted successfully and cheaply with gas as a fuel. Of course, many other factors, apart from the actual cost of the fuel, play an important part in these cases, as they also do in regard to brass melting.

Aluminium needs to be dealt with entirely as a separate metal, so large has been the demand in recent years for articles made with this interesting and useful metal. Town gas is undoubtedly the ideal fuel for melting aluminium. During the period of high-priced gas, many firms changed over to oil and solid fuel; but all are returning to gas rapidly now that prices are reasonable, and extensions and new additions to plant are thought out and arranged for gas heating. One of the largest aluminium manufacturers in the Midlands continued to use gas throughout the war. In its early days of manufacture, aluminium was melted in plumbago crucibles of the type used for brass melting; but, though these are still necessary in making-up aluminium alloys with copper, most aluminium melting is carried out in iron pots. This is particularly the case in the die-casting processes which have been adopted in the manufacture of motor-car, cycle, and magneto parts, and many other articles of everyday necessity. The usual practice in a die casting shop is to have a battery of large iron pot furnaces into which the aluminium alloy is placed for melting; the metal when ready being transferred to smaller re-heating pots from which the operators take their metal for casting into the dies. One small pot usually feeds four dies and is kept continually supplied with metal already in a molten condition. Both the large and small alloy pots are of a similar design to the furnaces already mentioned for the melting of low melting-point metals. The burners used for production work must be of the gas-and-air blast, mixed gas and air types, or, for simplicity, ease of control, and ease of costing, the high-pressure gas type. I give herewith the working results obtained over two days on two of the larger furnaces referred to, using high-pressure gas at about 11 lbs. per sq. in.

Aluminium Melting.

Total gas consumption per day for two furnaces	15,320 c.ft.	14,320 c.ft.
	Tons Cwt. Qrs. Lbs.	Tons Cwt. Qrs. Lbs.
Total weight of aluminium melted	1 13 1 12	1 11 0 2
,, ,, ,,	3736 lbs.	3474 lbs.
Consumption per ton of metal melted	9180 c.ft.	9185 c.ft.
Consumption per lb. of metal melted	4·1 c.ft.	4·1 c.ft.
Average consumption per hour per furnace	730 c.ft.	682 c.ft.

It is difficult to give figures in the case of the smaller pots, as each individual case varies with the type of die in use, and consequently the amount of metal required to be taken from the pot during any period. The larger the quantity required, the higher the gas consumption necessary to maintain the metal in a molten condition. Oven and melting furnaces are probably the only industrial gas-apparatus which have been in any way standardized; and having considered them, it will be necessary for me to deal with specialized gas applications—probably a little disjointedly.

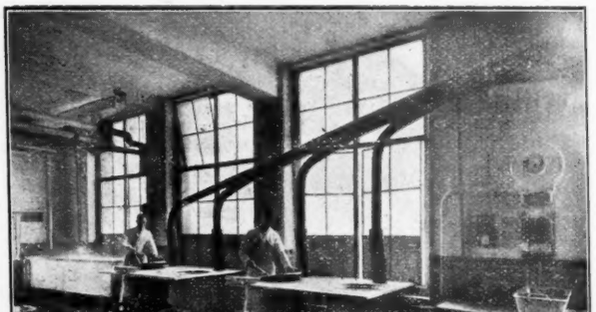
Tube Manufacture.

Tubes of all sorts and sizes play so prominent a part in industry to-day that a consideration of gas applications to their manufacture should be of interest. Gas-heated oven furnaces are used for the several annealing processes to a large extent. Seamless tubes are, of course, being made and used very extensively, but many firms are making the brazed or jointed tube. About four years ago I had the privilege of bringing to your notice a furnace which had been designed to meet a demand for improved methods of working. At that time, small steel and brass tubes only had been dealt with, but with slight alterations made to meet individual demands, furnaces are being used for the brazing of brass and copper tubes of all gauges up to 5 in. diameter, and the smaller gauges of steel tubes up to 1 in. diameter. The furnace has also been used for the brazing of cycle rims in long lengths before making up.

A gas-furnace with a hearth 30 in. in length, and heated by two gas-and-air-blast burners, and given a gas consumption of 200 c.ft. per hour, will give a throughput of sixty ¾-in. (G. length) brass tubes per hour.

Sugar Boiling.

Gas is essentially the fuel to be used in the production of foodstuffs, and should be used to the exclusion of solid or oil fuels in all food manufacturing concerns. A great deal of valuable work has been, and is being, carried out both by makers of apparatus and interested gas men up and down the country. In Birmingham, we are repeatedly installing gas-apparatus for bread making, confectionery, and sugar boiling.



Gas-Heated Stoves at Bournville.

It is with an installation of gas-heated stoves for the latter operation I wish to interest you. Birmingham is fortunate in having within its area the "Factory in a Garden," or the well-known works of Messrs. Cadbury Brothers, Ltd., of Bournville. Recently this firm opened a new wing to their factory; and we were approached with a view to submitting gas-stoves for "croquante" making. Several tests with known types were carried out, but it was found necessary to design and test a stove with several novel features; the main idea being to give a heating-by-radiation effect with its consequent evenness over the whole of the under part of the bowl-shaped copper pans used for this work, rather than the local action obtained by any form of direct flame contact stove. The final stove supplied consisted of a steel-plate circular casing standing on legs sufficiently high to bring the top of the stove to a level convenient for operating, lined inside with arch and firebrick, and with burner inlets placed in opposition on the centre line of the floor of the stove, entering the combustion chamber about 1 in. above floor level. Over the outlet is placed a distributor in firebrick or, lately, in carborundum material; and the whole of the floor area is covered with refractory material, which when heated rapidly becomes incandescent and gives the evenness of heating desired. Messrs. Cadbury Brothers, Ltd., have found that with the adoption of gas the stoves can be placed in the shop where the material they are making-up can be directly utilized. The cleanliness is obvious and is appreciated by the workpeople, and the time of lighting-up can be fixed definitely with the assurance that production will commence very shortly after—in fact, almost immediately. Working is then absolutely continuous, as there are no periodical stoppages for making-up fires, &c.

The results vary with the material handled. The average consumption of each of the stoves is about 150 to 200 c.ft., and a 16-lb. batch of croquantes is melted in 7½ mins., and a 32-lbs. batch in 10 mins. Meters are being fitted to the various shops

in which these stoves are being installed, and accurate records of gas consumption will be taken for costing purposes. Eight of these stoves have been installed, and eight further stoves are just being put into commission replacing an equivalent number of coke stoves. A further large installation is being completed at another works out of Birmingham.

CYANIDE HARDENING.

In addition to oven-furnace consumptions for case-hardening processes, as a large number of manufacturers are turning their attention to the cyanide process of case-hardening, we are obtaining a number of inquiries for this class of furnace. Briefly stated, the cyanide process gives a slight depth of case very rapidly; the articles to be treated only having to remain in the molten cyanide for a period varying from four to ten minutes to obtain the depth of case found to be adequate for many of the parts of cycles and motor cycles, whereas in the older "pack-hardening" method the same articles would have remained in the carburizing compound from the time of filling the boxes to quenching out—a period of at least two or three hours. We have several interesting installations of furnaces for this particular class of work. Low-pressure gas is found inadequate for pots of any size over about 12 in. deep by 8 in. or 10 in. diameter, as the cyanide mixture has to be kept at a temperature of 850° C., and needs to keep up to a rapid output of work. One installation in Birmingham consists of a number of small pots placed into a specially constructed setting similar to that used in the low-pressure oven furnace. The remaining installations all consist of the deep bowl pot fixed into a brickwork setting shaped to the pot and with a roughened surface as already described. A burner of the ring type supplied with gas at town pressure and air at about 1 to 1½ lbs. per sq. in. plays under the pot containing the cyanide. In the earlier furnaces of this type, the flames and products emerged round the top of the pot and the products were taken away through the canopy flue provided for carrying the cyanide fumes away. With this method, it was found that the ordinary tendency of cyanide to "creep" was intensified owing to the temperature being kept up. Thus great trouble was experienced with stopped-up burners and replacements of brickwork settings. We have now completely separated the heating arrangement from the cyanide offtake, with considerable improvement. We are continually experimenting, and are in touch with the cyanide producers and makers of pots, with a view to obtaining an improved design of furnace. The pot life has been a very serious item against the use of cyanide, the average mild steel pot only giving about 85 hours' life. Pots made of nickel chrome steel alloys have been used successfully. The gas consumption will, of course, depend on the amount of work put through the pot during a day's run.

JAPANNING AND LACQUERING STOVES.

There are many trades to-day in which processes are carried out requiring some form of japanning, enamelling, and lacquering; and gas heated stoves are almost universally used for the drying of articles after treatment in the blacking or colouring liquid. The usual type of stove adopted is the double-cased packed stove—that is, its walls, top, and doors consist of double sheet steel plates filled with silicate of cotton or some other form of heat-resisting material. This type of stove is so much a standard that insufficient attention is often paid to its installation; usually the cheapest in initial cost being installed. The burners fitted to most of these stoves until recently have been of the open-injector type. I have seen many stoves in a sorry plight with this type of burner; rag and paper bindings and all sorts of methods being resorted to in order to prevent lighting-back where the stove has been placed in a draughty position or the gas supply may have been inadequate at periods. All bar burners used on these stoves should be fitted with an injector with an air sleeve allowing full control over the air supply. Stoves made of single sheet steel casing should not be installed except in very special circumstances. It is difficult to give working results with these stoves, as conditions of work vary so much; but the following test on a stove made by Messrs. Silas Hyde, of Birmingham, fitted with burners of the type mentioned, and installed in our Demonstration Rooms, may be interesting:

Test on Double-Cased Japanning Stove.

Size of stove, 3 ft. 9 in. by 5 ft. 11 in. deep by 5 ft. 8 in. high.

Time taken to reach temperature of 470° Fahr.	1 hour 10 mins.
Total gas consumption	421 c.ft.
Average gas consumption per hour	361 c.ft.

Of course, there are some drying processes demanding very even heating over the whole stove interior, and freedom from contact with the products of combustion, for which it is necessary to supply an inner sheet steel casing, making a triple-cased stove. Two flue outlets are therefore necessary, one for products of combustion and the other for the products of the drying process in the interior.

WATER OR SOLUTION HEATING.

In many plating shops, gas is used under tanks of all sorts and sizes, mainly of the rectangular type; and the results of two experiments with a tank 3 ft. long by 2 ft. wide by 2 ft. deep will serve to show to a customer the saving to be effected by the use of an insulated stand casing instead of a single stand or no attempt at heat conservation which is so often met with.

Results of Test.

Solution Tank.	With Casing.	Without Casing.
Time to reach boiling point	2 hours 30 mins.	3 hours 20 mins.
Total gas consumption to reach boiling point	264 c.ft.	362 c.ft.
Gas consumption per hour to maintain the boiling-point temperature	31·5 c.ft.	44 c.ft.
Total gas consumption for 8 hours	450 c.ft.	570 c.ft.

It would be possible to continue with individual installations to a great length, but I think I have given sufficient to show the tremendous field which is available for gas used as an industrial fuel. I have endeavoured to quote any figures as tests which have been carried out under practical working conditions, allowing for stand-by losses which have to be encountered. It may be that some have better figures for individual installations. It is difficult to make comparisons, as works practice varies so very much in different parts of the country. It is also impossible to lay down any hard and fast rules relating to gas-furnace installations of any kind, as each inquiry or installation needs to be considered entirely on its own merits.

The representative of a gas undertaking handling such inquiries undoubtedly needs to be a "Jack of all Trades." He should certainly know as much about the product he is selling as is possible; and with tact and common sense, and a desire to obtain and apply knowledge gained, he will readily acquire a certain amount of knowledge of the processes which he is asked to consider, and be able to advise in the matter of gas heating. The men are few and far between who are likely to have full knowledge of all the works processes and practices with which they are likely to come into contact.

In conclusion, I should like to thank the Birmingham Gas Committee and Dr. C. M. Walter for permission to read this paper, and for the use of photographs and data in connection with Birmingham installations.

Discussion.

The CHAIRMAN commented upon the comprehensive character of the paper.

Mr. CLARK (Derby), in proposing a vote of thanks to Mr. Hems, described the paper as one of the best of the session. It was marked by thoroughness, and was particularly interesting in point of detail. He thought too much importance could not be attached to the industrial load, and the Birmingham Gas Department were indebted to members of their staff for the valuable pioneer work that was being done in their Research Laboratories.

Mr. GEE, in seconding the resolution, observed that the paper showed a close knowledge on the part of Mr. Hems of the latest improvements and developments in gas furnace work, which promised to become of vital importance to the future of the industry. He would like to know what was the increase of efficiency due to the pre-heating of the secondary air.

Dr. C. M. WALTER (Birmingham Research Laboratories) described the résumé of the many appliances of gas for industrial purposes as very complete. The details had been arrived at on a practical working basis. As to the japanning of stoves, some of the older furnaces were fitted with injectors which had no means of properly regulating the secondary supply of air at the injector mouth. Mr. Hems had been responsible for some of the more modern types of these japanning stoves. The cyanide solution tanks and stoves were also the result of a great deal of experimental work done by him.

Mr. C. F. W. RENDLE (Redditch) congratulated Mr. Hems upon his paper. As to japanning stoves, he would like to know whether in dealing with work of a high-class and delicate character he had received any complaints as to the gas imparting an undesirable bloom to the surface of the japanned article.

Mr. W. L. S. SPINKS commented upon the importance of maintenance work being done in connection with furnaces. This was a point which could well be stressed in many cases.

Mr. S. W. SIMMONS (Dudley) said it was apparent that the industrial side of the industry was gaining importance in most manufacturing areas. In South Staffordshire and elsewhere there was scope for developments in regard to fish frying.

Dr. TINKER commented upon the informative character of the paper.

The CHAIRMAN said that papers of this kind, which contained so many valuable figures, tended to increase the status of their Association. There was no doubt that the Research Department of the Birmingham Gas Department stood very high in the estimation of industry in the country. He thought other undertakings would do well to follow what Birmingham had done, particularly in the maintenance section.

Mr. HEMS, replying on the discussion, said there was no doubt in his mind that the industrial side of the business must be in the forefront. The increase of efficiency on pre-heating the secondary air, with oven furnaces of the direct type, would not exceed 10 or 15 p.ct. In some cases it might be lower. He had only known of one case where a "bloom" was imparted to work in japanning or lacquering stoves; but he could not say that it was due wholly to the effect of the gas—it might possibly be explained, in part at least, by the character of the covering material used on the articles.

A Reuter message from Lethbridge, Canada, states that a gas flow, measuring 62,000,000 c.ft. daily, from the greatest gas well in the Dominion, is now being brought into control at Coutts, near Alberta, on the Montana boundary. The gas was struck at a depth of 2528 ft., while drilling operations were being made for oil. The well, if connected by pipeline, will be sufficient to supply both Lethbridge and Calgary with their domestic fuel requirements.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Visit to the Meter Works of Messrs. J. and J. Braddock.

On Saturday afternoon, the 26th ult., over a hundred members of the Association travelled to Oldham, for the purpose of inspecting the meter works of Messrs. J. and J. Braddock, Ltd., where they were welcomed by the Chairman and Managing-Director (Mr. G. H. Braddock, J.P.), Mr. R. E. Braddock (Director), and other members of the firm. In addition to the President of the Association (Mr. W. Heathcote, of Halifax), visitors from the Manchester Junior Gas Association—including the Senior Vice President (Mr. J. T. Haynes, Bolton), the Hon. Secretary (Mr. J. Alsop, Bolton), and Mr. Livesey (Stretford)—were present. Parties were organized; the following gentlemen acting as guides: Mr. G. H. Braddock, Mr. R E. Braddock, Mr. Taylor, Mr. John Berry (Works Manager), Mr. W. T. Glover, Mr. R. Fowler, Mr. J. A. Maylor, Mr. E. C. Carter, Mr. F. Hepple, and Mr. H. Fletcher.

The operation of metal melting, as carried out by gas furnaces (four being in use, and doing the work previously accomplished by fourteen solid-fuel fired furnaces) was witnessed; it being explained that the consumption of gas was 4 c.ft. per pound of metal melted, and that after the first heat had been attained it was possible to melt metal at the rate of 150 lbs. per hour, which could be reduced to three-quarters of an hour if necessary. The firm are the third largest consumers in Oldham. The metal-stamping machines attracted considerable attention, and one marvelled at the simplicity of working when a straight piece of tin was put into the machine and was almost immediately transformed into a neatly shaped box with turned-over edges. In the brass-fitting shop the latest automatic machines were in operation, including many types of capstan lathe, where brass fittings were being turned out by the thousand. There were machines by which the crown wheels and spur wheels were cut; and when the necessary cutting was finished, the machine automatically stopped. By this means it is possible for one man to look after two machines—one machine automatically doing the work while the other is being recharged. One in particular evoked considerable comment by the visitors, very small brass screws being cut from solid brass rod 10 or 12 ft. in length, turned, screwed, and polished direct. It was explained that the machine was as near human as possible, and one realized the truth of this as a small shaft traversed to and fro like a hand, taking the finished screw from one part of the machine and depositing it in another.

All the brass shavings were being specially treated to extract the oil which they had collected while being subjected to what seemed to be a perfect deluge on the capstans. The making of meter indices and their assembly was seen; and it was observed that each man assembles the whole of the meter and gives it a number identifying it as his particular workmanship—thus making it possible at any time to tell exactly who had been responsible for the meter in question. The making of meter diaphragms was being carried out with extreme care; the chromes being examined in their dry state, and again after treatment in oil. Every diaphragm as to the perfection of which there was the slightest doubt was discarded, and the members saw leathers apparently sound being put aside—it being explained that, though at the moment there was no danger, the suspected parts might in the course of four or five years become worn, which would seriously affect the meter. The repairing of meters is carried out with extreme care, and the repairers themselves are not allowed to condemn a diaphragm. If any doubt as to the condition arises, the diaphragm is passed to one man who alone is responsible for the testing. The diaphragms are pressed into the wings, no sewing being used; and when finished and treated in oil, they are placed on racks in a room of an even temperature, and allowed to remain until thoroughly dry. In the assembly of meters no spirit is used with the solder; the various tinned fittings being dipped into a solder bath, which treatment, followed by washing in water and drying in sawdust, leaves a fine film of solder on the edge of the fitting. This facilitates the soldering, only the iron and a very small quantity of solder being required. All the solder needed is made on the works.

The erection shop, where station meters and station governors are made, was specially interesting. The spraying of the meters, the examination, and the packing were all witnessed, and large cases containing fifty meters were seen ready for dispatch. In the offices, where the members assembled after the tour of inspection, were many forms of the firm's manufactures, including a meter of the earliest design at the side of one of Braddock's latest patent meters. Other new features regarding gas-meters which will be on the market in the near future were explained.

The members were then taken to the Engineers' Club, Oldham, where they sat down to an excellent tea served at the invitation of Messrs. Braddock. After tea,

The President, in a happy little speech, alluded to the pleasant afternoon they had spent. He had been very much struck by the largeness of the works, the magnificent organization, and the attention paid to every little detail in the production of the gas-meter, which had earned for the firm a grand reputation in the industry.

Mr. S. T. S. Musgrove (Sheffield), proposing a vote of thanks to Messrs. Braddock, to the gentlemen who had acted as guides, and to the workmen, said the visit had proved, in addition to being extremely interesting, of great educational value, and the impressions gained would remain with them a long time. They all had something to do in their daily work with some of the manufactures of Messrs. Braddock; and while they already knew the firm by the reputation of the goods sold, they had that day seen the magnificent organization which went towards making this reputation.

Mr. F. Lodge (Wakefield), seconding, said that Messrs. Braddock were to be congratulated on their large and highly efficient works—clock-like regularity of the various operations blending throughout the whole of the processes.

Mr. J. T. Haines (Bolton) endorsed the views of the previous speakers regarding the efficient organization.

Mr. T. Duxbury (Oldham) remarked that, as an honorary member of the Manchester Juniors, he was delighted to have met the members of the Yorkshire Junior Association. They in Oldham were very proud of Messrs. Braddock. They looked upon the firm as one of the best-conducted in the town. A family spirit ran right through the concern. He had known the firm for forty years, and they were in the front line of meter manufacturers.

Mr. G. H. Braddock, responding, said they had been fortunate in having the works and all the machines running. Had they not been able to do this, he felt sure the visit would not have been so entertaining. He thanked the members for their hearty vote.

Mr. John Berry said he had been delighted for the members to visit the works. They were a very happy family there, and the utmost good feeling existed between all members of the staff.

Empire Mining and Metallurgical Congress.

The inaugural session of the Congress will open in Conference Hall No. 1 at the British Empire Exhibition on June 3, and on the same day a reception will be held at the Imperial College of Science and Technology, by kind invitation of the Rector, Sir Thomas H. Holland, and Lady Holland. An interesting programme has been arranged for the three following days; and among the papers to be read, "Fuel Economy in Iron and Steel Works" will be contributed by Sir Robert H. Hadfield, and "A Comparative Survey of Coke-Oven Practice in Various Countries" by Mr. G. Hebden.

Metric Equivalent Tables.

From the Central Translations Institute, Ltd., we have to acknowledge—with more than the reviewer's customary and stereotyped thanks—the receipt of "Thirty Useful Metric Equivalent Tables." The tables are confined to ordinary linear, square, avoirdupois, &c., equivalents; and useful "approximates" are also given, such as: Hectare = nearly 2½ acres; and 1 cwt = nearly 51 kilos. (which reminds one of the inaccuracy of the usual "2 lbs. to a kilogram"). For ourselves, we shall find the card very useful, as we attempt by translation to keep our readers *au fait* with gas matters of interest from abroad; to others, we can recommend the tables as a good sixpennyworth, though we cannot find the conversion of B.Th.U. to calories (3·968 B.Th.U. = 1 calorie). The Institute's address is Salisbury House, London Wall, E.C. 2.

Cheaper Gas at Derby.—Under an agreement between the Derby Corporation and the Gas Company, the price of gas in the town has been reduced from 7·15d. to 6¾d. per therm, or from 3s. to 2s. 9¾d. per 1000 c.ft.

Bakewell Gas-Works Dispute.—A threat to strike on Saturday afternoon by the men in the employ of the Bakewell Urban Council at their gas-works was fortunately not carried out. The threat was the result of a wages dispute with the Council; but shortly before the time for ceasing work, the men decided to continue on the Council's terms.

Hessle Capital Issue.—The Directors of the Hessle Gas Company have instructed Messrs. A. & W. Richards to offer for sale by tender £10,000 of additional capital stock ranking for a standard dividend of 8 p.ct., subject to the sliding-scale. The authorized dividends have been paid on the original stock for many years, and the rate on the additional stock corresponding to the rate for the last half of 1923 on the original stock is £10 16s. p.ct. per annum. The minimum price at which this additional stock is offered is £137 10s. per £100, yielding (at the rate of dividend named) £7 17s. 1d. p.ct. Tenders must be sent in to Messrs. Richards, at No. 37, Walbrook, E.C., not later than 11 o'clock on Tuesday, May 20.

Accrington and the Whalley Gas Undertaking.—Mr. H. R. Hooper, an Inspector of the Ministry of Health, held an inquiry at Accrington last Wednesday into the Accrington and District Gas Board's application to borrow £2000 for the purchase of the Whalley Gas Lighting Company's undertaking, as well as for sanction to borrow £5000 for other purposes in connection with the extension of the Board's works. Mr. Aitken (the Clerk) said the gas at Whalley was not made by the Company, but at Longworth's Mill, where a larger plant than the mill required had been put in, so that they could supply the village. The people of Whalley were anxious to have an additional supply from Accrington. Both Whalley and Billington adjoined the Board's area of supply. They could give gas to Whalley and Billington without any great expenditure. It was proposed to erect a small holder at Whalley of 50,000 c.ft. capacity, and to connect it with their high-pressure mains, which were laid from Great Harwood through Whalley Road to Accrington. They were expecting a considerable increase in the number of consumers at Whalley, because the price would be less. Mr. A. J. Harrison (the General Manager) said the people of Whalley were now paying 6s. 9d. per 1000 c.ft. for gas, and the Board would be able to supply them at 1s. 9d. cheaper. No opposition was offered to the proposals.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas Regulation Act.

SIR,—It is not my intention to join in the controversy which Mr. Evetts and "Gas Engineer" have initiated with regard to the merits of this Act, and I express no opinion for or against it; but it does recall to my mind a particular meeting, presided over by Sir George Beilby, when I expressed my surprise at the hesitancy exhibited by the gas company interests in adopting the heat basis of charge. That their fears were groundless has since been frequently recorded in your columns, and never was the industry more firmly based in public favour—not on sentimental grounds, but from sheer necessity—than it is to-day. Financially it is also on a stronger basis, as under the Act in question its loan and debenture stock is admitted to be a charge against manufacture, and increased interest charges are now provided for; its right to increase the proportion of loan, &c., stock in relation to ordinary capital was being generally conceded prior to 1914, and is now more largely indulged in.

The provisions of the Gas Regulation Act permitting increased costs over pre-war amounts to be added to the pre-war standard price, has placed the ordinary stock, at the least, close up to a gilt-edged security, as the revision clause secures the financial stability of the dividends in relation to pre-war rates in the future, which even another war will not disturb. What the gas interests have really gained by the Act are many advantages in the manufacturing departments, which gas engineers alone can fully appreciate, and which are reflected on the balance-sheet.

Another important gain is that the pre-war standard price, at whatsoever date established, is now practically unchallengeable, notwithstanding the invariable practice of Parliament prior to 1914 to adjust the standard price with any change of quality prescribed. My own view is that the industry had best leave well alone, as there are others who could make out quite a good case for material alterations.

Another point which must not be lost sight of is that, whereas in pre-war times the financial incidence of dividend and interest offered little (if any) inducement to municipalize the supply, any material increase in capital and interest charges will make such policy one of practical application.

W. R. HERRING.

Harold House,
4, Arundel Street, Strand, W.C.,
May 2, 1924.

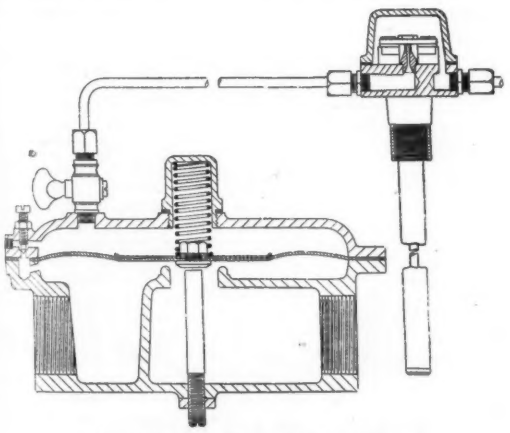
REGISTER OF PATENTS.

Temperature Control.—No. 213,394.

KEITH & BLACKMAN CO., LTD., and KEITH, G., both of Farringdon Avenue, E.C. 4.

No. 5180; Feb. 22, 1923.

This invention relates to automatic temperature-control apparatus of the type including a gas-regulating device responsive to the operation of a thermostat.



Keith-Blackman Thermostatic Controller.

The thermostat device comprises a rod and a surrounding tube composed of metals of different coefficients of expansions—for example, a tube of brass to the outer end of which is secured one end of a steel rod, the other end of which protudes into a gas chamber. At temperatures below that at which the thermostat is designed to influence the gas-regulating device, the operation of the steel rod is to hold the valve seat member away from a gas nipple, in opposition to the resiliency of spring means which on retiral of the steel rod consequent on increase of temperature press the seat against the nipple and interrupt the delivery of gas through the latter.

This device works in conjunction with a regulator, as shown in the vertical section reproduced.

As long as the seat member is held out of engagement with the nipple, gas flowing through a by-pass connection in the regulator passes into the thermostat chamber, and the pressure of gas under the diaphragm holds it unseated, and gas continues to flow to the heating apparatus. When, under the action of the thermostat device, the seat member is permitted to engage the nipple, the gas flowing through the by-pass connection accumulates in the upper compartment of the diaphragm casing, and in consequence of the action of the spring the diaphragm is caused to close the gas-way.

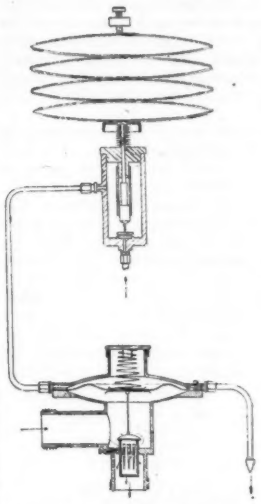
Temperature Control.—No. 213,789.

FAIRWEATHER, W. C., of Chancery Lane, W.C.

No. 12,035; May 4, 1923.

[A Communication from Holland.]

This invention relates to a device for regulating the gas supply to apparatus which requires uniform temperature.



A Dutch Thermostatic Controller.

The device is controlled by a thermostat acting on an auxiliary regulating member in a secondary gas current, the controlled pressure of which, due to the auxiliary regulating member, is transmitted through a length of conduit to a diaphragm to which the main gas-regulating member is attached. The device includes a chamber containing the auxiliary regulating member and a chamber containing the diaphragm and main regulating member; the chambers being separate units spaced apart and connected to one another by the conduit.

According to the invention, there is employed an imperforate diaphragm, and the compartment of the diaphragm chamber opposite that occupied by the main regulating member is connected at separate points to the conduit aforesaid and to a discharge conduit for the secondary gas; the connection to the second conduit being preferably by way of a controlled outlet.

The apparatus is shown in the accompanying drawing. The patentee is aware that "it has previously been proposed to employ a thermostat to operate an auxiliary valve controlling a by-pass tube connected to a diaphragm chamber in which the diaphragm forms the valve proper, the sealing of the by-pass tube causing the inlet pressure in the chamber to close the diaphragm against its seat."

Sealing Dry Gasholders.—No. 212,870.

No. 20,598; Aug. 13, 1923.

Convention Date: March 14, 1923.

MASCHINENFABRIK AUGSBURG NURNBERG, A.G., of Nurnberg.

In dry gasholders (in which the variable gas space is closed by a vertically moving liquid-sealed closing disc) the sealing liquid must be continuously supplied to the gap existing between the disc and the walls in order to keep the seal gas-tight. It has been found in practice, say the patentees, that it is very difficult to distribute the liquid evenly over the whole circumference of the disc, and the method of employing a number of pumps to raise the liquid to the top of the holder has not always proved sufficient.

According to this invention, the liquid is raised to a number of elongated tanks round the circumference of the holder near the top. These tanks are connected by pipes; and they communicate with the interior of the wall by notched weirs, so that the sealing liquid commences its downward flow in a great number of small streams which spread out as they descend towards the groove round the disc. It is claimed that this combination of methods ensures even distribution of the sealing medium.

Rotary Retorts, &c.—No. 212,961.

NIELSEN, H., of Muswell Hill, N. 10, and LAING, B., of Hatfield.

No. 31,857; Nov. 21, 1922.

This invention relates to retorts, kilns, dryers, or the like of the kind that are divided longitudinally into a suitable number of zones or compartments by means of baffles disposed transversely across the retort.

According to the present invention, certain (or each) of the baffles are provided at their free ends with a shelf or shelves constituted by an extension or by a plate or plates disposed transversely, or extending laterally, of the baffles, and preferably reaching at its ends to the interior wall of the retort. Such baffles are very effective in bringing the heating medium into more intimate contact with the material undergoing treatment on account of the natural tendency of the gaseous heating medium to travel along the top of the retort. Furthermore, the laterally projecting shelves compel the gas to pursue a sinuous path, so that the baffles and shelves situated in the lower part of the retort, and arranged alternately to those attached to the upper part of the retort, can also be made equally effective.

Carbonization.—No. 213,040.

DAVIES, W. E., of Victoria Street, S.W. 1.

No. 1641; Jan. 18, 1923.

This invention relates to a process for the full utilization of the bituminous ingredients in fuels such as coal, wood, peat, lignite, or cannels, but particularly coals, by carbonizing them at high, medium, or low-temperatures but above 500° C., and producing superior coke or semi-coke from a range of raw materials containing volatiles of 15

to 45 p.ct. The invention further relates to a method for the blending of coals facilitating the process, thereby embracing a wider range of raw materials. To give full effect to the invention in this latter aspect it will sometimes be necessary or advantageous to form perforated briquettes prior to carbonization, adding to the raw material a binder of bituminous nature, if required, on the lines of patent No. 127,940.

The specification extends to more than ten columns of the well-known form.

Loose-Flange Pipe Joints.—No. 213,136.

Williams, C., of Swansea, Bellamy, W. G., of Morriston, and The British Mannesmann Tube Co., Ltd., of Swansea.

No. 10,713; April 19, 1923.

This invention relates to loose-flange pipe joints of the kind wherein one or more split flanges and connections are used in conjunction with a number of bolts and nuts. It is claimed to be particularly suited for repairing broken flanges in a pipe line, and other cases where split flanges, or flanges in halves, are employed, and to be particularly adapted for rapid repairs to a pipe line where this is laid underground, as in mines and collieries where sudden fracture may occur due to subsidence of the ground or other causes.

According to the invention, the two halves of a split flange situated on one side of a pipe joint are connected together by means of a pair of plates arranged on either side of the pipe and secured to the split flange members by means of pegs which are fixed to, or engaged with, the plates and extend into holes in the split flange members, or *vice versa*. The two halves of the split flange are secured to the solid or split felloe (or opposing flange) on the other side of the pipe joint by means of the usual flange coupling bolts and of additional bolts connected to, or engaged with, the plates and extending through holes in the felloe flange. When one loose flange has fractured, it is replaced by one split flange; and when two loose flanges have fractured, two split flanges are employed. In the latter case the split of one flange at one side of a pipe joint would be placed at right angles to the split of the other flange on the opposite side of the joint.

Diaphragms for Dry Meters.—No. 213,296.

Gibson, L. K., of Edinburgh.

No. 26,421; Dec. 22, 1922.

This invention, relating to the diaphragms of dry gas-meters, covers the works process of assembling the leather and rings of the meter. The patentee claims a method and means for imparting to the diaphragm of a gas-meter a frusto-conical shape in which a portion of it is of greater diameter than the larger ring, consisting of a combined former and tying-on block made in sections, with means for preventing the two rings moving on the block.

Carbonization and/or Gasification.—No. 213,363.

Davies, W. E., of Victoria Street, S.W. 1.

No. 1646; Jan. 18, 1923.

This invention refers to a process of staged carbonization or gasification arranging for heating from one side of the charge, and staged release in corresponding zones of the distillate on the other side of the charge. It may be practised in any type of continuous or intermittent retort, whether vertical, horizontal, or inclined. Heat is introduced into the fuel in separated zones. Thus each zone obtains the necessary quantity of exterior and interior heat. A further feature consists in that the supply of heat takes place only from one side of the enclosing walls of the fuel chamber, so that substantially all the remaining portion of the enclosing wall, being free, can be specially adapted for the withdrawal of the products in a direction away from the heating surface, and they are not exposed to the detrimental influence of the heat introduced.

To compensate for the non-heated parts of the enclosing wall, an intensive interior zoned heating takes place, preferably through the same portion of the enclosing wall. This combination of exterior and interior heating is claimed to give simple thermal control; and the gases resulting from the fuel are quickly and completely driven out.

Advantage, says the patentee, will be gained by the introduction of gases into the fuel, which will eliminate such compounds as oxygen, and prevent it from interfering with the coking effect and the generation of gases. "The gases specially adapted for introduction purposes are carbonic oxide, carbonic acid, hydrogen, &c. These gases can be introduced into the fuel either alone or together with steam."

The arrangement for the operation of the process provides that each zone receives its separate supply of fuel and of air for combustion, and has its own space of combustion; and the waste gases may be used entirely or partly for preheating the fuel or the air, or both, or for the interior heating of the fuel or as the gases of reaction. By this means the waste heat produced in a given zone will again be returned into the same zone and be utilized.

In the course of his specification (which extends to some 17 columns) the patentee gives the following comparative figures:

Gas-Works Practice—Without Steaming.

Gas	70 therms
Value	550 B Th.U.
Tar	16 therms
Coke	12-12·5 cwt.

With Steaming.

Gas	80-100 therms
Value	400 B.Th.U.
Tar	17-20 therms
Coke	9-10 cwt.

Everard Davies' Process.

Gas	100 therms
Value	500 B.Th.U.
Tar	16-20 therms
Coke	8·5-10 cwt.

Heat-Control in Water-Gas Making.—No. 213,476.

Humphreys and Glasgow, Ltd., of Victoria Street, S.W. 1. (A communication from W. H. Gartley and O. B. Evans, both of Philadelphia.)

No. 16,459; June 25, 1923.

The patentees point out that automatic time-control mechanism in water-gas sets is well known; but in practice it has been found that, on account of unavoidable variations in the character of the fuel bed, the control of the set by operating the valves according to a definite time interval will not always produce a uniform temperature at that part of the apparatus at which the temperature should be regulated for the most efficient production of gas.

One object of the present invention is to avoid the above-mentioned defects and disadvantages, and to insure good results with time controlled mechanism regardless of the varying conditions of the fuel and fire. The invention, generally stated, comprises the combination with time control of temperature control which (without changing the time-control mechanism, which is set for the best results over long periods of operation) varies the quantity of gas-making fluid (generator air, carburettor air, or steam) admitted, and thus tends to maintain uniform heats.

According to one method which is described, the temperature control originates with a thermo-couple in the carburettor. The current from this is made to actuate a galvanometer needle which is extended to function with sets of contacts. These determine the direction of run of an electric motor, which in turn controls one or other of the valves of the plant.

Prepayment Meters.—No. 213,501.

Taunton, R. P., and M'Indoe, R. W., both of Birmingham.

No. 22,060; Jan. 18, 1923.

This invention provides an additional feature of the type of prepayment meter registered under various specifications (previously noted) by the patentees.

A hinged flap valve is mounted on a rotary member within a valve chamber having a delivery aperture leading to the meter; and a wide inlet opening is arranged in the box or chamber through which access may be had to the flap valve to permit the removal thereof, a plug having a gas passage being provided for closing the inlet aperture.

Regulators for Radiators.—No. 213,776.

Radiation Ltd., of Birmingham, and Yates, H. J., of Grosvenor Palace, S.W. 1.

No. 10,220; April 14, 1923.

In gas-steam radiators, the amount of gas admitted to the burners may be automatically regulated by pressure of steam on a diaphragm which by its proximity to the aperture of a nozzle controls the flow of gas. Ordinarily the position of the nozzle in relation to the diaphragm is fixed, and in consequence no adjustment can be effected after the apparatus has left the maker's works.

The object of the present invention is to enable adjustment at any time; and accordingly the nozzle is screwed into a portion of the heating apparatus adjacent to the diaphragm and is adapted at its outer end to be rotated for adjustment. An intermediate portion of the nozzle is grooved or recessed and perforated to afford the required communication with the gas inlet pipe.

Gas Burners for Stoves, &c.—No. 213,841.

Olivier, G. P., of Compton Street, W.C.

No. 23,596; May 14, 1923.

The object of this invention is "to provide a burner which will withstand considerable and continuous heat and is indestructible." The patentee employs a material consisting of aluminium either pure or in any light alloy except such as contains metal of a low melting-point, further alloyed with pure silicon or with any of the less refined forms of silicon such as are commonly sold and procurable under the name of commercial silica. The amount of silicon used for the purpose of constructing burners in accordance with this invention depends largely upon the object for which the burner is intended, says the patentee, but should not be less than 2½ p.ct. nor more than 5 p.ct. It is desirable that the aluminium employed in the alloy should be pure, though the presence of small quantities of copper or iron do not greatly reduce the effectiveness of the material.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 30.]

Nos. 9873 to 10,373.

Duckham, A. M.—"Operating vertical retorts for carbonizing fuel." No. 10,313.

Duckham, A. M.—"Operating vertical retorts for carbonizing fuel." No. 10,364.

Kilburn, B. E. D.—"Apparatus for cooling incandescent coke." No. 10,020.

Renault, L.—"Gas-producers for self-propelled vehicles." No. 9975.

Sulzer Frères Sté. Anye.—See Kilburn, B. E. D. No. 10,020.

Vedder, W.—"Gas-burner for gas fired furnaces." No. 10,154.

Woodall Duckham (1920) Ltd.—See Duckham, A. M. Nos. 10,313, 10,364.

MISCELLANEOUS NEWS.

EASTBOURNE GAS COMPANY'S STANDARD PRICE.

An Application for Reduction.

The lead given by the London County Council in applying for reduction of the standard prices of gas companies within their area, has been followed by the Eastbourne Corporation, who have made an application to the Board of Trade for amending an Order of April, 1921, in favour of the Eastbourne Gas Company, which Order fixed the standard price of the Company. Mr. H. C. HONEY (Director of Gas Administration at the Board of Trade) on Tuesday of last week conducted an inquiry into the Corporation's application. That there was a case for a reduction was not disputed, and the inquiry resolved itself into a somewhat detailed examination of figures put forward by the Consulting Engineers on either side, in order to arrive at what should be the amount of the reduction.

Mr. ROWAND HARKER appeared for the Corporation, and Mr. JACQUES ABADY for the Company.

Mr. ROWAND HARKER drew attention, first, to an ambiguity in regard to the powers of the Company as to charging a differential price in parts of their area of supply. He explained that the Company were incorporated in 1868, with powers to supply in the town of Eastbourne and the parish of Willington; and by Acts passed in 1880 and 1909 those limits of supply were extended. The standard price was fixed by the Act of 1880 at 4s. 4d. per 1000 c.ft., and, so far as he could ascertain, up to 1909 there was no power to charge a differential price outside Eastbourne itself. In the 1909 Act, however, power was given to charge 5d. per 1000 c.ft. more in the area added by that Act than in the limits of supply as they existed up to then. In 1920 the Company were among the first to apply for an Order under section 1 of the Gas Regulation Act. The standard price at that time, converted into a price per therm, was 10·4d., and the differential already referred to was 1d. per therm. The Company on that occasion put forward estimates the result of which was to persuade the Board of Trade, in the Order granted in April, 1921, to give them a standard price of 18·6d. per therm, the differential being 1d. per therm. In 1924 the Company obtained an Order under section 10 of the Act; and in this the "existing limits" of the Company were defined as the limits under the existing Acts, and the "existing Acts" meant the Acts granted from 1868 to 1909. The Order of 1924 added further parishes to the area of supply, those parishes being referred to as the "added limits," and gave the Company the right to charge 1d. per therm more in these added limits than within the existing limits. The difficulty was, said Mr. Harker, to know what price could be charged in the "existing limits." The present charge in the area as it existed before 1909 was 10d. per therm, and they could charge 11d. in the area added in 1909; but it was not clear whether they could charge 11d. or 1s. in the area added in 1924. The Company were now charging the same price in the area added in 1909 as in the original area.

Mr. HONEY said his recollection was that this arrangement was agreed between the representatives of the Corporation and the Company when the 1924 Order was considered.

Mr. HARKER was instructed that the Corporation had then objected to the differential, but the particular point he was at present dealing with was not raised previously.

Mr. ABADY said it was intended that the price allowed to be charged in the added limits, by the 1924 Order, should be not more than 1d. per therm above the lowest price charged in the existing limits; and there was no objection to introducing a clause in the Amending Order to give effect to this.

Mr. HONEY said his impression was that, after what the representatives of the Company had said in regard to this matter at the previous inquiry, it would be extremely difficult for them ever to make a differential charge in the area which was added in 1909; and, if they never did this, there was no difficulty about the amount of the extra charge they might make in the area added in 1924.

Mr. ABADY said the Company felt they could not abandon the powers obtained in 1909.

Mr. HONEY intimated that if the matter could be put right by a clause in the Amending Order, as Mr. Abady had suggested, this course would be adopted, though he was a little doubtful as to how it could be done. If not, then all the Corporation could rely upon was the undertaking that had been given by the Company previously—that they would interpret the 1924 Order as meaning that they could not charge in the added area a differential of more than 1d. above the lowest price charged in the existing area.

Mr. HARKER, coming to the subject-matter of the inquiry, dealt with the dividends paid by the Company in 1914 and since 1921, to show that, since the 1921 Order was granted, the profits of the Company had rapidly increased, and that they had distributed higher dividends than in 1914, though not as much as they were entitled to. Also, they had increased their carry-forward to a very considerable extent in 1922 and 1923 as compared with 1914. Therefore the financial position of the Company had obviously improved very much during recent years; and this in the view of the Corporation had been due largely to the high standard price fixed by the Order of 1921. It was also important to note that, in spite of the fact that the standard price was fixed at 18·6d. per therm, based on the Company's own estimates, the charges for gas had never been within 3d. of this. The charge from May 1, 1921, to the end of that year was 14·8d.; for the first half of 1922 it was 13·8d.; for the third quarter of 1922 it was 12·8d.; and for the fourth quarter 12·2d. For the first quarter of 1923 the charge remained at this figure; for the second and third quarters it was 11·6d.; and from October, 1923, to the present time it had been 10d. per therm. Since December, 1921, they had not found it necessary, in order to earn the profits which would enable them to pay the increased dividends, to charge the differential of 1d. per therm. It was obvious that there must be a substantial reduction in the standard price; and in order to arrive at the amount, Mr. Arthur Valon, who had advised the Corporation, had applied the same principles as he had in the recent applications by the London County Council—*i.e.*, he had taken the year 1923 as a basis of quantity of gas made, the quantity and price of coal used, and the quantity of residuals produced, making adjustments wherever he had considered it right to do so, in order to arrive at an estimate of a normal year's working upon current prices. Counsel then discussed the principle which should be applied in arriving at the savings effected in the cost of manufacture, for which the Company should be given credit. In the view of the Corporation, the only satisfactory way of approaching the matter was to attempt to ascertain the total reduction in the cost of supply since the 1921 Order, and then it was for the Company to satisfy Mr. Honey as to how much (if any) of this total reduction had been due to circumstances within their control. The first thing to do was to decide which year represented a normal year's working; and, though he did not lay it down as a final principle in all cases, in the great majority, and certainly in this case, the only possible year to take as representing a fair normal year's working was 1914. If the year in which a company applied for a revision of price (1920) were taken as a basis of their normal working, the position would be that, if the conditions under which they were then carrying on their undertaking were bad, and they were allowed credit for all the improvements which had taken place as between 1920 and to-day, they would be very much better off when an application for a revision of the standard price was made than would be a company who in 1920 were carrying on their business efficiently. This was a situation which, in his submission, could never have been contemplated by the Act of Parliament. In this particular case, seeing that in 1914 there was a fairly normal year's working, the comparison should be between that year and to-day, in order to arrive at the savings effected. The Eastbourne Company would suggest that, so far as savings were concerned, they were entitled to say their starting-point was 1920, and that whatever they could show as being savings effected by circumstances within their control between 1920 and to-day was an amount for which they were entitled to credit in arriving at the new standard price. This was the substantial difference between the parties in the present case.

Mr. *Arthur Valon*, Consulting Engineer, giving evidence, said that, in arriving at his suggested new standard price, he had used the year 1914 as a basis. After measuring the increased costs from 1914 to the date of the Company's application for the 1921 Order, and from 1914 to the present time, the deduction of the one from the other gave the amount by which the present standard should be reduced. He handed in tables, showing his estimate of the present costs of supply, and how he arrived at what the new standard price ought to be.

ESTIMATE OF STANDARD PRICE.

—	Pence per Therm.			
	d.	d.	d.	d.
Standard Price.				
Fixed by Board of Trade		18·60		
Pre-war standard price		10·40		
Increase in cost of supply under Gas Regulation Act, as found by Board of Trade				8·20
Estimate of Present Cost of Supply.				
34·97d. per 1000 c.ft. at 499 B.Th.U.			7 01	
Add reduction of cost within the control of the Company			0·43	
Present cost of supply if 1914 standard of working maintained			7·44	
Pre-War Cost of Supply.				
Year to June, 1914		22·89		
Adjust for repairs, &c., of works, allow average	2·22			
Year to June, 1914	1 64			
		0·58		
At 540 B.Th.U.		23·47	4·35	
Increase in cost over pre-war				3·09
Fall in cost of supply				5·11
Existing standard price				18 60
New standard price				13·49

Other tables showed an estimate of the standard price based on accounts for the half-year to December, 1923 (the figure arrived at being 13·89d. per therm in this case), and an estimate of the reduction in cost due to circumstances within the control of the Company—namely, 0·43d. per therm. Witness was satisfied that there had been an improvement in working due to circumstances within the control of the Company, and had given credit for it in arriving at his figure of 13·49d. per therm.

With regard to the majority of the details of the tables, the parties were substantially in agreement. As to the price of coal, which Mr. Valon gave, in his table dealing with the present cost of supply, as 36s. 9½d. per ton, Mr. Abady said the figure should be 37s. 4d. As to repairs of works, Mr. Valon considered the amount spent in 1923 was abnormal, and had taken the average pre-war cost *plus* 80 p.ct. in arriving at his figure, which was 4·65d. per 1000 c.ft.—the figure put forward by the Company being 5·41d. His estimate of the cost of supply of gas in a normal year was 34·97d. per 1000 c.ft.

Witness, referring to his estimate of the savings effected through circumstances within the control of the Company, said the working in 1920 was not so good as in 1914, though at the present time there was an improvement over 1920. The best way to arrive at those savings was to take 1914 as a standard, and compare it with 1920 and 1923.

In the course of cross-examination, Mr. ABADY said that the figure

given by Mr. Valon for the cost of coal—namely, 36s. 9¼d. per ton—was taken from the Company's accounts for the second half of 1923. The actual price paid for coal in that half-year was 37s. 4d., but the lower figure appeared in the accounts because they had been using coal bought at the lower figure in the previous half-year. Therefore, assuming that for the next six or nine months they would have none of the cheaper coal available to reduce the average, the Company were entitled to take this higher figure.

Witness said that, if they were going to do this, they would have to allow something for coke, because he had taken the figure for coke revenue in that half-year, and the prospect for coke was extraordinarily good. He adhered to his figure of 36s. 9¾d. for coal, because that was the price of the coal actually used.

With regard to repairs of works, the figure given by the Company, exclusive of depreciation, was £10,470, and Mr. Valon's figure was £9016. The Company's figure represented an increase of 112 p.ct. over the pre-war average, and Mr. Valon's represented 80 p.ct. The reason for the higher figure was that 63 p.ct. of the total expenditure was in respect of materials and work done by contract, the cost of which had increased 100 p.ct.; the remainder being in respect of work done by the Company's own men, the cost of which had increased by 133 p.ct.

Witness said with most companies it was the other way about. There was an obvious comment, but he supposed he must not make it.

Mr. Abady, after pointing to a number of items in connection with repairs the cost of which had increased by 100 p.ct. or more, said that Mr. Valon had made no provision for the special purposes fund in his tables.

Witness replied that his reason for leaving it out was that the creation of such a fund was optional, and a company might or might not have one.

The Company's Case.

Mr. *George Evetts*, Consulting Engineer to the Company, then gave evidence, and put-in ten tables dealing with the cost of manufacture of gas, in which he assumed that the gas sold in 1924 would be 529 million c.ft., instead of 540 million c.ft., which latter was the 1923 figure, and was the basis of Mr. Valon's tables. Also the declared calorific value had been reduced from 540 to 500 B.Th.U., and he had based his tables upon a calorific value of 510 B.Th.U. His calculation of the new standard price was as follows:

Calculation of New Price.

		Pence per Therm.
Cost of Gas in 1913-14—		
As per schedule. . .	23·27d. per 1000 c.ft.	
Less—Fittings profit .	0·34d. ,,	
	22·93d. ÷ 5·40	4·25
In 1920 Board of Trade granted a price of.	18·6d.	
Deduct original standard	10·4d.	
∴ Increase in cost proved		8·20
∴ Cost of gas in 1920 accepted by Board of Trade . .		12·45
Present Cost of Gas on Similar Basis—		
39·83d. ÷ 5·10		7·81
∴ Fall in cost		4·64
Savings Effected—		
Carbonizing	0·72d. per therm	
Wages on coal and coke	0·52d. ,,	
		1·24
∴ Fall in cost outside undertaker's control		3·40
Existing standard price		18·60
New standard price		15·20

Mr. Valon's Method of Direct Calculation Since 1914.

Cost of gas in 1914	4·25d.
,, ,, 1924	7·81d.
Increase	3·56d.
Original standard	10·40d.
	13·96d.
Add savings since 1914	0·40d.
New standard price	14·36d.
According to calculation above . .	15·20d.
Difference	0·84d.—*i.e.*, 1·24d. *less* 0·40d.

Dealing with the price of coal, witness said that 37s. 4d. per ton was the contract price between September, 1923, and October, 1924. He had taken the price of oil at 5½d. per gallon, whereas the present cost into the works was 6½d. In regard to his figure of saving due to circumstances within the control of the Company, he said that three of the factors which had brought this about were that they had put in a second coal-handling plant, and a new coke-handling plant, and had re-organized the working of the retort-house by changing over from eight-hour shifts and eight-hour charges to twelve-hour charges and eight-hour shifts, so that they were now working the retort-house in two shifts of eight hours, instead of three shifts of eight hours as in 1920. With regard to the repair of mains and services, at the instance of the Corporation a clause was inserted in the Company's Act of 1909 putting upon them the onus of repairing damage caused by steam-rollers, and this had been rather an expensive clause from the point of view of the Company. They found it necessary now to relay their pipes at a deeper level than previously, in view of this unfortunate clause. Though it was in operation before the war, the effect of it had been more marked in the last year or two. It would make the cost of repairs of mains and services always high.

In the course of cross-examination by Mr. Harker, reference was made to an item of £600 in Mr. Evett's estimate of the present cost of gas, under the heading of "special repairs," relating to a gasholder.

Witness said this holder, of 1¾ million c.ft. capacity, was built in 1901, in a period notorious for bad steel; and it was essential that it should now be repaired. This would occupy probably seven or eight months, and a new holder had to be erected for use during that period. Its capacity would be ¼ million c.ft., and it would cost £14,000. Of this, £7000 had already been charged to capital, and it was anticipated they would so charge another £4000, leaving £3000 to revenue. They were asking an allowance for interest on the capital sum of £11,000, which would amount to £600 per annum.

Mr. Harker said it was known that the holder was in a "rocky" condition when application was made for the 1921 Order, and it was put forward as part of the case for the increase in the standard price asked for that they would have to spend extra money upon it. He suggested that no attempt had been made to set aside anything out of revenue for the repair of the holder.

Witness pointed out that £1460 a year had been set aside for this purpose since 1920, in place of the pre-war figure, which was £936 a year. The £600 per annum was justified, because it was in respect of the new holder, and that was a special case.

Mr. Abady, addressing Mr. Honey, impressed upon him that the wording both of the Gas Regulation Act and of the rules which the Board of Trade had set up appeared to indicate that it was not a comparison with the 1914 figure which an advocate for an Amending Order had to show. The present application was one to reduce the standard price. This standard price had been fixed by an Order, and therefore any reduction or amendment that had to be made ought to be in terms of the price fixed by that Order, and the comparison made with the year 1920, as Mr. Evetts had done. It was the Order granted to the Company in 1921 which was the starting-off point. The question of whether the standard price would, or would not, have been greater if it had not been for the savings effected due to circumstances within the control of the Directors of the Company, was not put to the Board of Trade in 1920; and, so far as he knew, a gas company had never claimed the benefit of any savings when asking the Board of Trade to adjust their prices in the first instance. But, having obtained a standard price, which it must be presumed was fixed and adjusted only according to circumstances beyond the control of the Directors, they were entitled to say that their present cost would have been higher but for the savings effected by circumstances within their control.

Mr. Honey asked whether he would be right in saying that the clear intention of the section of the Act which governed this matter was that such an alteration in the standard price should be made as would not affect the normal working of the sliding scale. There might be many circumstances which, under the normal operation of the sliding-scale, would increase or reduce the dividends of the Company. Those circumstances were not to be taken into account in making the alteration of the standard price in the first place, and the revision of the standard price by an Order such as was asked by the Eastbourne Corporation was simply to adjust the difference between the original standard price and the altered standard price, so as still not to affect the normal working of the sliding-scale.

Mr. Harker agreed with that view.

Mr. Abady remarked that it was what he had tried to argue.

Mr. Honey said it seemed to him if they agreed with this, that every decision of the Board of Trade was mathematically correct, and it did not matter whether they compared present costs with those of 1914 or 1920, because, in making the original Order, the figures were so adjusted that any alteration in circumstances which, by the ordinary working of the sliding-scale, would inure to the disadvantage or advantage of the Company, had been taken into account. If they showed that, by taking the 1920 figures instead of the 1914 figures, they were entitled to a bigger credit for savings, what they were in fact proving was that the decision in the case of the 1921 Order was a wrong one.

Mr. Harker agreed that, so far as possible, the Board of Trade ought not to make an Order which would interfere with the working of the sliding-scale; but in a case where the results in 1920 as compared with 1923, and as compared also with 1914, were so very divergent as in this case, it did suggest that the working in 1920 was abnormally bad. A company should not be allowed to come to the Board of Trade for the purpose of getting their standard price fixed, and put forward certain estimates, and then, when they had to answer an application for revision, without very good reason go back upon the estimates upon which the Board of Trade granted them the original standard price.

Wirksworth Gas Order.

Mr. Honey held an inquiry at the offices of the Board of Trade last Friday into an application for a Special Order under the Gas Regulation Act by the Wirksworth Gas Light and Coke Company, Ltd.; but pressure of other matter compels the holding-over until next week's issue of the report of the proceedings, which is already in type. The Company, who have for many years past been supplying gas in the urban district of Wirksworth as a private concern, seek statutory powers to continue the supply and to extend their limits, as well as to raise further capital and to fix a maximum price for gas.

Limerick Gas-Works Plant.—The City of Limerick Gas Committee have asked the Corporation to apply for permission to borrow £30,000 for new carbonizing plant and extension and renewal of mains.

Records at Manchester.—The Manchester gas undertaking has in the past year achieved three records. Its output—7,135,580,000 c.ft.—is the largest in its history; in one day of the year it produced 30,000,000 c.ft., which had never been done in a single day before; and the increase of output on the previous year—524 631,000 c.ft.—is its greatest annual increase. The total income for the year was £1,537,184, and the expenditure £1,235,410. Interest and sinking fund charges amounted to £205,381, leaving a net profit of £96,393. The cost of the recent reduction in the price of gas was £95,000. The increase in the output is attributed mainly to the advantage taken by the consumers of the Gas Committee's offer of free cookers and easy rates for gas-fires.

COLOMBO GAS AND WATER COMPANY, LTD.

Annual General Meeting.

The Annual General Meeting of the Company was held at the Offices, No. 148, Gresham House, Old Broad Street, E.C., on Monday, April 28—Mr. STRACHAN C. CLARKE (Chairman) presiding.

The SECRETARY (Mr. A. C. Pullen) read the notice convening the meeting and the Auditor's report.

The CHAIRMAN: Gentlemen, a copy of the report and statement of accounts having been sent to all the shareholders, I will ask you to take them as read.

My first duty is to refer to the very great loss the Company sustained on March 31 by the death of Mr. Arthur F. Phillips, who had been on the Board for 26 years and who had acted as our Chairman since as far back as April, 1903. The Company was in a very low position when Mr. Phillips became a Director, and, under his guidance, the works and settings were remodelled. Welsbach incandescent gas lighting was then coming into use and the Company secured the public lighting contract by introducing this system of lighting and obtaining new lanterns from Berlin. It was necessary to issue further debentures and, in 1900, the debenture debt amounted to £47,833. The total of the bonds outstanding to-day is £11,400, a reduction of £36,433 and we now have investments the market value of which is £46,086. During the past few years we have gradually increased our dividend on the ordinary shares and the Directors are recommending a dividend for 1923 at the rate of 10 p.ct. per annum, free of tax. I have mentioned these brief particulars because we feel that the shareholders, especially those who, in back years, purchased their holdings cheaply on the market, are deeply indebted to Mr. Phillips for the part he has taken in bringing the Company to its present prosperous condition.

I am glad to say that Mr. Leonard Askew, who, during Mr. Phillips' connection with the Company, has assisted him in the engineering work relating to our concern, will in future assist the Board in the capacity of Consulting Engineer.

The Board have elected Mr. Alexander A. Johnston, Chief Engineer and Manager of the Brentford Gas Company, to the seat on the Board vacated by Mr. Phillips' death. Mr. Johnston has had very wide experience as a gas engineer in this country and his advice will be very valuable in dealing with the problems which will arise. I may mention that the Brentford Company is one of the six largest gas companies.

I refer with regret to the resignation last year from the Board of Mr. A. Ernest Phillips. Mr. Robert Heriot Glen was elected to fill the vacancy. He was at Colombo for some time in the early part of last year and, as a Director and Auditor of gas companies, he will be of great help to the Board.

The opening of the new holder by the Mayor of Colombo was made the occasion of a pleasant function and photographs of this holder, the new buildings and also of friends present at the ceremony are available to shareholders in another room. Considerable alterations to the Company's plant are now in progress at the works and when these are concluded we should, in the opinion of our Manager, be able to meet all the town of Colombo's gas requirements for the next twenty years.

Before I comment upon the Company's accounts and the results for the past year, I would mention that, owing to our securing coal at a lower price, we were enabled to effect a small reduction in the price of gas as from April 1, 1923. A coal contract has now been arranged for 1924 and 1925 at a still lower price and our gas rates were again lowered on the 1st inst. The Board decided to make a further considerable reduction in the price of gas for cooking and heating, which special diminution will, we hope, largely extend the sales in this branch of our trade. The sales of gas during 1923 further increased by about 10 p.ct., mostly in the private consumption. We sold 708 tons of coke more than before and about the same quantity of tar as in 1922.

Reference to the capital account will show an addition of £4191, mostly in connection with the new holder. The cost of the work now proceeding will be included in the current year's accounts. The total cost of coal was rather more, in consequence of the increased quantity carbonized. I am pleased to say our Manager is now obtaining over 14,000 c.ft. per ton of coal, the actual average for the past three months being 14,066 c.ft. Wages and salaries are somewhat higher, but this is due to the local bonuses paid on the profits to all employees, from the Manager to the labourers. During the early part of 1923, serious labour trouble was experienced in Colombo, but our own works were entirely unaffected, despite efforts on the part of the strike organizers to put the town in darkness. We made a small special money grant to the workmen in appreciation of their loyalty. Maintenance of works and plant account is more. We purchased two new motor lorries, the use of which has proved very satisfactory. Maintenance of mains was enhanced by Rs. 9221. Special work on the mains was carried out, part of the cost being charged against the reserve for retorts, &c. Trade charges were less; the amount for 1922 included cost of a new motor car for the Manager. On the credit side of the revenue, gas-rentals improved by Rs. 24,586, in spite of the reduced price of gas. Residuals were better, as a result of the larger coke sales. Gas-fittings, &c., account was rather less, but we are working on lower rates of profit and will maintain that policy, as the principal object in view is to sell our gas. Exchange account showed a credit for the adjustment of remittances and shipments, owing to the favourable rate for the rupee during the year. Our assets remain in the books at 1s. 4d. per rupee. I think these are all the comments it is necessary to make on our accounts. The prospects so far of the coming year are so favourable that, in any case, the extra profit will more than pay for the special reduction in the rate for cooking and heating.

The balance of net revenue is £21,981, and the Directors recommend a final dividend of 3½ p.ct. on the preference shares, less tax, also a final dividend of 5 p.ct. on the ordinary shares, free of tax, and to add £5000 to general reserve account.

Mr. Phillips referred, at our last general meeting, to the fact that not the least of the Board's anxieties in the past have been connected with staff. It is right I should emphasize what Mr. Phillips then stated as to Mr. Johnson, our present Manager, who is a most capable engineer, is extremely keen in obtaining the best results and in pushing our business. The Board are confident that Mr. Johnson is doing everything that is possible to further our interests in Colombo, and they know he does not spare himself.

The Ceylon Government have recently and suddenly passed the hydro-electric scheme, which last year was dropped. This must, to an extent, affect our business in coming years, but we shall make strenuous efforts in the meantime to much enlarge our present trade. We do not expect the scheme to be in operation until five years have passed. With these remarks, I have pleasure in moving that the report and accounts be received and adopted.

Mr. JOHN G. WARDROP seconded the resolution, which was unanimously carried.

The CHAIRMAN then moved the following resolution, viz.:

> "That a dividend for the year ended 31st December, 1923, at the rate of 7 p.ct. per annum upon the preference shares, less income-tax, and 10 p.ct. per annum upon the ordinary shares, free of income-tax (both less interim dividend paid on 1st October, 1923), be and is hereby declared, the warrants to be payable on 3rd May,"

which was seconded by Mr. ROBERT H. GLEN and unanimously carried.

The CHAIRMAN: The next resolution I have to propose is for the re-election as a Director of Mr. John G. Wardrop. We all know of Mr. Wardrop's valuable work in the past for this Company, both as a member of the Local Committee and as a Director. I have much pleasure in proposing his re-election.

Mr. ROBERT H. GLEN seconded the resolution, which was unanimously carried; and, in thanking the shareholders, Mr. Wardrop mentioned that his official connection with the Company as a member of the Local Committee dated so far back as 1878.

Mr. ALFRED W. OKE proposed the re-election of Mr. William Cash as Auditor for the current year, which was seconded by Mr. HERIOT R. GLEN and unanimously carried.

Mr. ALFRED W. OKE then proposed a cordial vote of thanks to the Chairman and Directors and to the Officials of the Company. He referred to the work which Mr. Phillips had done for the Company for so many years and said that Mr. Phillips' outstanding character would always be remembered. Mr. Oke congratulated the Directors on the excellent accounts presented and mentioned that it was very gratifying to know, by the Chairman's remarks, that during a time of serious labour trouble in Colombo our own men remained thoroughly loyal to the Company. It was most satisfactory to know that the Board had been able to arrange a coal contract for 1924-25 at a still lower price.

Mr. HERIOT R. GLEN seconded the resolution, which was unanimously carried, and the CHAIRMAN, in acknowledging same, referred to the great help rendered to the Board by the Secretary and said he would again like to mention how very keen Mr. Johnson, our Manager, is, and that Mr. Johnson is doing excellent work in Colombo for the Company. The SECRETARY also briefly responded, and the proceedings then terminated.

STAFFORD GAS-WORKS REPORT.

It is stated by Mr. T. H. Poulson, the Engineer and Manager, in his annual report to the Stafford Corporation Gas Committee, that the gas made for the year ended March 31 was 325,061,000 c.ft., compared with 309,820,000 c.ft. last year, being an increase of 15,241,000 c.ft., or 4·9 p.ct. The gas accounted for amounted to 315,413,000 c.ft., compared with 297,118,000 c.ft. a year ago, being an increase of 6·1 p.ct. This leaves 9,648,000 c.ft. unaccounted-for, or 2·96 p.ct., as compared with 4·1 p.ct. last year.

During the year, 17,900 tons of coal were carbonized, resulting in a make per ton of 17,947 c.ft., compared with 17,229 c.ft. per ton the year before—an increase of 718 c.ft. The cost of coal throughout the year averaged 27s. 2d. per ton, as compared with 30s. 6d. per ton, or 18·512d. per 1000 c.ft., against 21·419d. last year. The total income from residual products was £14,779, against £13,164 in the previous year.

The result of the year shows a gross profit, as analyzed by the Borough Treasurer, of £18,389. After providing for repayment of loans, interest on capital, income-tax, and renewals fund, there remains a net surplus of £3334, against £9394 last year—a decrease of £6060. With the amount of £501 brought forward from the previous year, there is a total undistributed surplus of £3836, of which £1000 has been voted to the relief of the general district rate for the current year, leaving a balance of £2836, to be dealt with as follows: £1500 to renewals fund and £1336 to be carried forward to next year's account.

Having regard to the possibility of the increase in the price of coal, Mr. Poulson recommended a reduction in the price of gas of not more than 3d. per 1000 c.ft., to take effect from the June readings of the meters.

The Gas Committee expressed their appreciation of the results obtained.

New Company.—With a capital of £2000, Super Lights has been registered to acquire from F. Smith an invention relating to an improved construction of inverted incandescent gas-burners.

Gas for Housing Schemes.—The Halifax Gas Committee have passed a resolution that the necessary gas-mains be laid to the houses to be erected at the Quarry House Estate, free of cost to the Housing Committee, provided that gas-fires are fitted in two of the bedrooms in each house, the cost of each fire to be borne by the Housing Committee (£3 5s. complete and fixed), and provided also that the Housing Committee will allow a gas-cooker to be fixed in each house at a cost of £5 per cooker, such cost in the first instance to be borne by the Housing Committee, but subject to the Gas Committee agreeing to take out at any time any cooker which may not be required by a tenant, and re-imbursing the Housing Committee the full cost of such cooker.

HONG KONG AND CHINA GAS COMPANY, LTD.

Annual General Meeting.

The Annual General Meeting of the Company was held at the Offices, No. 148, Gresham House, Old Broad Street, E.C., on Wednesday, April 30—Mr. Robert H. Glen, F.C.A. (Chairman), presiding.

The Secretary (Mr. A. C. Pullen) read the notice convening the meeting and the Auditors' report.

The Chairman: Gentlemen, a copy of the report and statement of accounts having been sent to all the shareholders, I will ask you to take them as read.

It is with the very deepest regret that I refer to the death of Mr. Arthur F. Phillips, who had been our respected Chairman since so far back as April, 1903. Mr. Phillips has acted in what I may term the dual capacity of Chairman and Consulting Engineer. He always took a great deal of trouble with our affairs and, even after being stricken with the illness which proved fatal, he continued his work for us. The Company's position three or four years ago was a sore trial to Mr. Phillips and his efforts to put our business on a more satisfactory footing have been unceasing. I am sure that I voice the feelings of the shareholders when I say that we are all deeply indebted to Mr. Phillips.

Mr. Leonard Askew has been elected by the Directors to the vacancy on the Board. Mr. Askew assisted Mr. Phillips during the whole time of our late Chairman's connection with the Company and his knowledge of our affairs and his standing as a gas engineer will be very valuable to us in the future.

I was not present at the general meeting last year, as just about that time I was in Hong Kong in connection with the Company's affairs. Mr. Johnson, the Manager of the Colombo Gas Company, was also there to give me technical advice and I hope our joint visit has proved and will prove of benefit to the Company. In his speech that day, Mr. Phillips referred to the sale of land which had just taken place at Hong Kong.

This land was reclaimed from the sea many years ago and, fortunately for us, the Company bore its share of the reclamation costs and acquired the site afterwards known as Marine Lot 302, facing our works. In disposing of the same and the buildings which stood thereon, a substantial appreciation of capital has resulted.

Considerable additions have been and are being made to the public lighting by gas in Hong Kong and we have supplied a number of Messrs. Sugg's suspended "Littleton" lamps, the effect of which is very good. In order to make a demonstration of powerful street lighting, the Company have fitted up specially some lamps of 1000 c.p. We have also sold to private consumers during the past few months, good quantities of such lamps as Sugg's "Esher" and "Surbition." Our engineer is trying hard and, with success, to get back some of our lost lighting trade and, of course, we are doing all that is possible to develop the use of gas for cooking and heating. The Board hope this time next year to be able to report considerable increases in our business both at Hong Kong and Kowloon. The sales enhanced during 1923 by 5·32 p.ct. and 22·48 p ct. respectively, but our works at Hong Kong are capable of far greater business. Owing to the now rapid development of Kowloon, our sales there continued to increase and, for the month of March, 1924, they were 1 million c.ft. higher than in March, 1923. Benefit is being felt from the new holder at Kowloon and the new governor, &c.

Reference to our accounts will show that we have made additions of £4516 to capital, about one-half of which was for further payments connected with the new holder and also the new governor at Kowloon. Owing to the fact that we carbonized 829 tons more coal than previously, we do not show the large diminution in coal carbonizing account as was the case in 1921 and 1922, but the cost per ton for 1923 was $19·17 as compared with the previous rate of $22·77. Gas-rentals advanced from $398,123 to $428,368—a gain of over $30,000. Meters and fitting rentals increased from $54,436 to $58,549, and residual products from $46,378 to $57,615. The question of residuals is always in the minds of the Directors—it is such an important factor of any gas company's business—and we are by no means satisfied with our present results under this head. The Board are continually considering matters relating thereto. I do not think further comment need be made on the accounts. The balance of net revenue is £50,313, and a dividend for the year of 10 p.ct. free of income-tax is recommended, less the interim dividend of 5 p.ct. paid in October, 1923.

At our last annual meeting, reference was made to the fact that we had received a further offer for purchase of our business. This offer was under most careful consideration for a prolonged period and we eventually replied that, with an improvement in the terms, the Directors would place the matter before the shareholders and leave it to them to decide. We, as a Board, after looking at the matter from all points of view, did not consider that we were justified in recommending the shareholders to sell our really valuable properties and, as we hope, a business which should materially increase, on the terms mentioned. As Mr. Phillips said last year, such a matter as parting with the undertaking required very serious deliberation and we can only hope that our decision will prove to have been correct. With these remarks, I have pleasure in moving that the report and accounts be received and adopted.

Mr. John G. Wardrop seconded the resolution. Questions were asked as to the total gas sales at Hong Kong and Kowloon, also the present rate of unaccounted-for gas. The sale of land at Hong Kong and the offer received for purchase of the business were also alluded to by shareholders.

The Chairman then put the motion to the meeting and it was carried unanimously.

The Chairman moved the following resolution:

> "That a dividend at the rate of 10 p.ct. per annum, free of income-tax, be declared for the year ended 31st December, 1923, less interim dividend paid 8th October, 1923, the warrants to be made payable on the 3rd May,"

which was seconded by Mr. Strachan C. Clarke, and unanimously carried.

The Chairman: The next resolution I have to propose is for the re-election of Mr. John G. Wardrop. We all know how valuable a Director Mr. Wardrop is; and I have much pleasure in proposing his re-election. Mr. Strachan C. Clarke seconded the resolution, which was carried unanimously.

Mr. Heriot R. Glen proposed the re-election of Messrs. Cash, Stone, & Co., as Auditors for the current year and that the fee for the year 1923 and onwards be 50 guineas per annum, which was seconded by Mr. Alfred J. Kingdon, and carried unanimously.

The Chairman then moved the following resolution:

> "That the sum of 1000 guineas be voted to the Executors of Mr. Arthur F. Phillips in respect of the engineering work carried out by Mr. Phillips on behalf of the Company during the period of his Chairmanship."

The Chairman referred to the fact that Mr. Phillips had always acted as the Company's Consulting Engineer, which was quite outside the scope of his duties as a Director. It was not quite fair to an eminent man like Mr. Phillips that such work should have been carried out always without remuneration and some time ago it was decided to ask the shareholders for the vote now proposed. If passed, it would be paid to the Executors, as Mr. Phillips is now deceased.

Mr. Arthur C. Baily seconded the motion, which to him was a sad pleasure and he mentioned that shareholders realized how much Mr. Phillips had done for the Company. The resolution was carried unanimously.

Mr. Heriot R. Glen proposed a cordial vote of thanks to the Chairman, Directors, and staff, and, after a feeling reference to the late Mr. Phillips, said he could congratulate the Chairman on his first "Budget." Mr. Joseph R. Michael seconded the motion, which was carried unanimously.

The Chairman thanked the meeting for its expression of confidence and stated that the Directors had the interests of shareholders thoroughly at heart. The Secretary also briefly responded and the proceedings then terminated.

BURNLEY'S NEW GAS-WORKS.

The Burnley Corporation Gas Committee have now received the report of Mr. J. P. Leather (the former Gas Engineer) on the laying out of the site for the new gas-works at Old Hall, and the expert's observations on that report.

Mr. Leather strongly recommends the Corporation to erect horizontal retorts, arranged to be worked with full charges, together with any auxiliary carburetted water-gas plant that might be contemplated. He suggests the erection of ten settings, each containing ten horizontal retorts 23 ft. long by 24 in. by 18 in. in section. With these there would be economy in working, and by putting in full charges the gas would pass out quickly, and thus one of the chief advantages of the vertical retort would be realized. In retorts of these dimensions, he says, it should be possible to carbonize 17 to 18 cwt. of coal in twelve hours, as compared with the older processes of carbonizing between 8½ and 9 cwt. in six hours. By adopting the large charge, the retorts would be opened less frequently, with consequent reduced loss and labour. The coal would be projected into the retorts, and automatic discharging by means of a ram is advocated. The chief difficulty with horizontal retorts charged by machinery is dealing with the hot coke, and Mr. Leather suggests the adoption of a combination of two appliances which have separately had sufficient trial to justify their recommendation. The coke would be cooled and handled speedily by that method.

Mr. Leather points out that the setting of the retorts is of the utmost importance, for if the coal is not properly carbonized no after-economies can make up for losses in the retort. He recommends that the setting be carried out by men who have been trained in the Burnley Gas-Works, and on whom would fall the unpleasant work of hot repairs and flue cleaning if every brick was not properly placed. Mr. Leather hopes to do away with a large amount of ironwork which is usually necessary in the erection of new gas-works. As regards the carburetted water-gas apparatus, he suggests it should be similar to the present plant at the old works, and provision made for a relief holder having a capacity of 200,000 c.ft.

Until detailed drawings of all the buildings are made and quantities taken out, Mr. Leather states it is not possible to give any closer estimate of the probable cost than that he presented to the Committee last September. The amount was then estimated at £200,000. The interest and sinking fund on this, he states, would be more than recouped by the resulting economies in the manufacture of gas and handling of materials.

With the exception that he suggests the erection of fourteen settings, each containing ten horizontal retorts 22 ft. long by 24 in. by 18 in. in section, Mr. Doig Gibb's report is practically an approval of the points referred to and the ground covered by Mr. Leather.

Gas Price Reduction at Stalybridge.—At the next meeting of the Stalybridge Town Council, the Gas Committee will recommend a reduction of 3d. per 1000 c.ft. in the price of gas, bringing the charge down to 3s. This is the third reduction in twelve months; the first having been in April, 1923, of 6d., a further 3d. in December, and again now 3d. The present net price is only 9d. more than the lowest charge in pre-war days. The reduction has been made possible by the increased consumption during the last year. Councillor Greenwood (the Chairman of the Gas Committee), who has gone into the estimates carefully, states that, though they may be called upon to pay 2s. per ton more for coal, they will come out on the right side after making the reduction. A vigorous effort is to be made to educate people as to the advantages to be derived in cléaner homes, a purer atmosphere, and cheaper cooking and heating, by a more extensive use of gas.

WOODALL-DUCKHAM (1920), LTD.

Ordinary General Meeting.

The Fourth Annual Ordinary General Meeting of the Company was held at the Head Offices, No. 52, Grosvenor Gardens, S.W. 1, on Monday, May 5, under the presidency of the Chairman of the Company, Sir ARTHUR DUCKHAM, K.C.B.

The SECRETARY having read the notice convening the meeting,

The CHAIRMAN said: Gentlemen, the next business on the agenda is to receive and consider the accounts and the Directors' report for the year 1923; but before dealing with them, I should like to say a few words about the work which the Company is now doing, and what I anticipate it will do in the future. When I speak of the work we are doing, I should say the work which our subsidiary Companies are doing, because, as you know, this Company is now a holding Company, and works through its subsidiary Companies—mainly the Vertical Retort Company.

As to the present, the Vertical Retort Company has had a very successful year. We have had our fair share of vertical retort work, and I can say we have the goodwill of all our clients. The reason for this is that our endeavour is to do better than we promise, and we particularly pride ourselves on the fact that in every case we lay ourselves out especially to render "service" to all our customers. The "T.I.C." Company has brought to a successful issue one of the many applications of the molten metal bath, to which it has been devoting itself for the past four years, and as a result has in hand orders both for its tar dehydration and its tar distillation plants. Those plants which have been put to work have given results far above our expectations.

As to the future, we have greatly strengthened the position of our Company by making reciprocal agreements with firms of high standing abroad. As you know, for many years our Agents in America for vertical retort work have been the Isbell Porter Company, of Newark, New Jersey, while in France our good friends the Cie. Générale de Construction de Fours have been our Agents, and have worked in closest co-operation with us so far as vertical retorts are concerned. We are now entering into further arrangements with this firm to take over our new developments in France and other territories in Europe.

We have entered into a reciprocal agreement with the Stettiner Chamotte-Fabrik Company. This Company is constructing our vertical retorts in Germany, and we have the right to build their specialities—*i.e.*, inclined chamber ovens, intermittents verticals, refuse destructors, &c.—in this country and the British Empire. We have also entered into an agreement with the Koppers Company of America for the construction of their specialities—that is, the Becker coke-oven, bye-product and liquid purification plants, &c. In addition, in order fully to equip ourselves to meet the needs of our clients, we have taken up special apparatus for the cleaning, washing, and drying of coal. It will be seen that we have allied ourselves to three concerns of world-wide repute whose experience in the carbonization of coal is unrivalled. These three firms have all built up important technical research departments, and we, in our turn, have done the same. Consequently we are able to place at the disposal of our clients, not only a wide range of choice in carbonizing plants, but the combined knowledge and experience of the firms mentioned.

Turning now to the accounts which you have on the table before you, the profit and loss account it is unnecessary for me to deal with in detail. You see the satisfactory dividends which the Company has received from its subsidiaries, the ample provisions which it has made for contingencies and reserves, and the net profit carried to the balance-sheet. From the balance-sheet you will see that the assets of the Company, excluding goodwill, amount to £206,000. Of these assets the principal item is the holding of the entire issued ordinary and preference share capital of the Vertical Retort Company, which is included in the balance-sheet at its par value of £125,000. When I tell you that the balance-sheet of the Vertical Retort Company includes Government securities, against which there is no charge, amounting to £170,000, you will appreciate that the inherent value of this Company's holding in the Vertical Retort Company considerably exceeds the amount of £125,000, at which figure it is included in our assets. The balance-sheet shows "Other Investments" amounting to £17,800, all of which have been included at values which we consider are less than their realizable values.

Turning to the other side of the balance-sheet, you will observe that the ordinary share capital is now £60,000 and the preference share capital £7548; these amounts being little more than one-half of the capital as it appeared a year ago. With the circumstances which led to the reduction of capital you are familiar. On the retirement from the Company of Colonel Woodall and Sir William Jones, their shares were purchased by the Vertical Retort Company, and the anomalous position was thereby created that this Company held the whole of the share capital of the Vertical Retort Company, and the Vertical Retort Company held half of the share capital of this Company. To get rid of that undesirable position, the Vertical Retort Company surrendered to this Company the shares which it held, which were then cancelled, and the capital correspondingly reduced. You will therefore appreciate that the reduction was a pure matter of form. On the same side of the balance-sheet there is the "Reserve for Contingencies" of £20,000, a "General Reserve" of £80,000, and undistributed profits of £34,128.

Out of the undistributed profits of £34,128 you will be asked to confirm the payment of the dividend on the preference shares for the year 1923 of 10 p.ct. per annum, and to declare a dividend on the ordinary shares at the rate of 30 p.ct. per annum, this being equivalent to a dividend on the original capital of 15 p.ct. After payment of these dividends, there remains a balance to carry forward to 1924 of £19,847.

You will agree with me that the financial position of the Company is highly satisfactory. There is a great future in the line of business which the Company has carried on up to the present, and I consider that it has a large scope for wider development arising from our co-operation with the firms I have mentioned and from the activities of our own Development Department.

We have worked hard for many years and have gained a high reputation. We have developed an organization which enables us to live up to our motto that Woodall-Duckham's work is well done, and, as I have shown this morning, we have built up a financial position which gives confidence to our clients and will enable us to undertake work of any magnitude. I now beg to propose that the Directors' report and accounts be adopted.

The resolution was seconded by Mr. G. J. JACKSON and carried unanimously.

A dividend at the rate of 30 p.ct. on the ordinary shares of the Company was declared.

Mr. Fred Vale was elected, and Dr. E. W. Smith was re-elected, Director of the Company.

Mr. R. G. Longcroft was re-elected Auditor of the Company.

CITY AND GUILDS OF LONDON EXAMINATIONS.

The following are the questions set in the City and Guilds of London Institute Examinations, held on April 30, in the subject named. The maximum number of marks obtainable is affixed to the questions.

Coke and Bye-Products Manufacture.

Examiner, Mr. C. P. Finn, B.Sc., F.I.C.

FINAL.

(*Not more than eight questions to be attempted.*)

1. Summarize the more important requirements of the Acts of Parliament which apply to coke-ovens and bye-products plants (including tar distillation). (35.)

2. Describe with sketches any two of the following, and explain the purposes for which they are used: (*a*) A dephlegmator. (*b*) A centrifugal drier. (*c*) Some form of mechanical scrubber. (*d*) Any type of tar extractor. (35.)

3. Describe in detail (illustrating by suitable sketches) the production of motor spirit from crude coke-oven benzole. What tests are necessary for the control of the process and to ensure the requisite quality of the final product? (40.)

4. What method would you adopt to produce a dry neutral sulphate of ammonia? Calculate, making any necessary assumptions, the acid storage requirements for a plant carbonizing 500 tons of coal per 24 hours. (35.)

5. Write an account of the various types of appliances that are in use for lifting and transferring liquids produced and used on a coking plant. (40.)

6. Indicate from your own experience your ideas as to the general lay-out of a new coke-oven plant, including the type of plant which you would adopt, and referring to any pitfalls that you seek to avoid. (45.)

7. In what forms does sulphur exist in coal? How is the sulphur content of a coal distributed in the coking process? Explain how you would arrive at the total sulphur content of a coal. (35.)

8. Discuss the probable trend of development of modern coking and bye-product recovery practice. (45.)

9. Sketch some type of oven heated by "producer gas," and write a short account of all possible uses to which coke-oven gas may be put either at present or in the future. (40.)

10. Write a short essay on our present knowledge of the constitution of coal, referring particularly to any work which throws light on the coking properties of coals. (40.)

Conferences or Holidays.

The Belfast Gas Manager (Mr. J. D. Smith) has drawn his Committee's attention to a resolution passed by the General Purposes Committee, directing that when any of the chief officials of the Corporation attend more than one conference coming within the terms of the Public Health and Local Government Conferences Act of 1885, the period of absence from duty of any such officer in consequence of his attendance at more than one conference in any one year is to be reckoned as part of his annual holiday. He pointed out that the Belfast Gas Committee are members of three Associations—the Institution of Gas Engineers, the National Gas Council, and the British Commercial Gas Association—and that if this resolution were put into effect it would mean, so far as the Gas Committee were concerned, relinquishing their membership of at least two of these Associations, which would not be of advantage to the undertaking, as it was only by personal attendance and the exchange of views with managers of other undertakings, and by meeting heads of large manufacturing firms that it was possible for a manager to keep abreast of the times and become intimately acquainted with up-to-date methods in connection with the gas industry. So far as he was concerned, these visits could not in any way be called a holiday. The Committee concurred with Mr. Smith's views, and appointed a Sub-Committee to wait upon the General Purposes Committee and ask for a modification of the resolution in so far as the Gas Manager is concerned.

Royal Commission on Subsidence.—Mr. A. Mackay, Gas Engineer to the Stoke-on-Trent Corporation, has been invited to receive, at Stoke-on-Trent, members of the Royal Commission on Subsidence, and to give evidence to them on the spot.

Bingley Gas Finances.—The annual financial statement of the Bingley Urban District Council gas undertaking shows a profit of £4219 on the year's working, though the average cost of coal had been 27s. per ton, as against 25s. in the previous year. A reduction in the price of gas, it was stated to the Council last week, might be brought about after the successful year's working, but subsequent reductions would not be likely until a fresh system of carbonization was installed at the works.

REPORT OF THE OFFICIAL INSPECTOR OF GAS-METERS FOR THE CITY OF MANCHESTER.

Mr. S. Dyson (Official Inspector of Gas-Meters for the City of Manchester) has submitted to the Justices of the Peace his report for the year ended March 31.

The number of meters tested during the year amounted to 52,527, showing a decrease of 2026 as compared with the previous year. The fees charged amounted to £2910 15s. 9d. The sum of £76 was received from the Police Department for heating offices, &c., making a total of £2986—a decrease of £159. The expenditure for the same period amounted to £2982—showing a credit balance of £4. This is the second year in succession that the Department has made a small profit.

Of the meters tested, 2607 were rejected, or 4·9 p.ct. Of the total wet meters tested—viz., 4393—6·7 p.ct. were rejected, and of 45,527 dry meters tested, 2289, or 4·7 p.ct., were rejected. The number of prepayment meters tested during the year was 32,018. Standard meters tested numbered 5536; the remaining 14,973 being meters of the ordinary type.

The Committee of the Executive Council of the Association of Statutory Inspectors of Gas-Meters held their meeting at this Station to prepare their annual report, which is to be submitted to the general body of inspectors at a meeting to be held in London next June. The Inspector, having attained the age limit, has tendered his resignation, and will retire on superannuation in April. He has served in his present capacity for over thirty years; and as a mark of their appreciation, the Justices' Committee intend to present Mr. Dyson with an illuminated address.

The following is a short history of the Department, which may be of interest. Mr. Dyson was appointed Inspector in 1893, when the total number of meters tested in the Manchester Office was 11,000 annually, and the fees charged amounted to £442. The work has increased; the totals for the year under review are 52,527 meters tested and £2910 in testing fees. From 1861-93 (31 years) the working of the Department showed an average debit balance of nearly £300 annually. For the next two years the average debit balance fell to £139. For the following 11 years there was, however, a credit balance of nearly £700, and during the latter period £1471 was spent in buying new plant out of revenue. The Manchester Testing Station is considered by experts to be one of the finest and best equipped in the kingdom.

Mr. A. Winterbottom, the Deputy Inspector, who holds a Board of Trade Certificate, has been appointed Chief Inspector, in succession to Mr. Dyson, and Mr. James Bates has been appointed Deputy Inspector. Both officials have over 20 years service in the Department.

Mr. Dyson concludes by thanking the Chairman and members of the Committee for the many kindnesses extended to him during his term of office.

APPENDIX

Statement of Meters Tested for the Year ended March 31, 1924.

Size of Meter.	Meters Stamped.					Meters Rejected.					Total Tested.
	Wet.		Dry.		Number.	Wet.		Dry.		Number.	
	New.	Old.	New.	Old.		New.	Old.	New.	Old.		
1 light	..	..	2	10	12	..	..	..	3	3	15
2 lights	39	389	126	1,044	1,598	..	57	..	77	134	1,732
3 ,,	101	1418	5,035	19,520	26,074	..	146	91	1116	1353	27,427
5 ,,	1518	640	3,472	5,900	11,530	34	50	86	508	678	12,208
10 ,,	34	198	1,065	2,147	3,444	..	28	18	176	222	3,666
15 ,,	..	2	59	24	85	..	..	1	2	3	88
20 ,,	1	39	253	561	856	..	2	4	51	57	913
30 ,,	..	5	76	240	321	1	..	..	22	23	344
40 ,,	..	..	10	8	18	..	..	..	3	3	21
50 ,,	..	..	53	183	236	..	..	..	30	30	266
60 ,,	..	1	12	50	63	..	..	1	6	7	70
80 ,,	..	..	5	41	46	..	..	..	2	2	48
100 ,,	..	2	7	97	106	..	..	2	13	15	121
120 ,,	..	..	3	1	4	..	..	..	1	1	5
150 ,,	..	1	..	15	16	..	..	..	5	5	21
200 ,,	1	1	2	17	21	..	..	..	2	2	23
300 ,,	..	..	..	9	9	..	..	..	..	..	9
400 ,,	..	..	1	2	3	..	..	..	..	..	3
500 ,,	1	..	1	5	7	..	..	..	1	1	8
800 ,,	..	..	..	1	1	..	..	..	..	..	1
12,000 c.ft. per hour	1	..	..	..	1	..	..	..	..	..	1
12,500 c.ft. per hour	1	..	..	..	1	..	..	..	..	..	1
Standard meters—											
No. 1	..	..	712	19	731	..	..	22	..	22	753
No. 2	..	..	2,614	212	2,826	..	..	28	3	31	2,857
No. 3	..	..	1,781	13	1,794	..	..	10	2	12	1,806
No. 4	..	..	104	1	105	..	..	3	..	3	108
No. 5	..	..	12	..	12	..	..	..	..	..	12
	1697	2696	15,407	30,120	49,920	35	283	266	2023	2607	52,527

SUMMARY.

	Stamped.	Rejected.	Per Cent.
Total wet meters tested	4,393	318	6·7
Total dry meters tested	45,527	2289	4·7
	49,920	2607	4·9

Electric Light Failure at Fulham.—For about the fifth time during the last two or three months, there was a failure of the electric light at Fulham last Wednesday evening; Walham Green being deprived of current for about a quarter-of-an-hour. The cause of the trouble was stated to be a failure at a sub-station of the electricity works.

Southend Gas Capital Over-Subscribed.—There was considerable over-subscription of the £45,000 of 5 p.ct. perpetual debenture stock in the Southend-on-Sea and District Gas Company which Messrs. A. & W. Richards offered on behalf of the Directors. The tenders ranged from £100 down to the minimum price of £96 10s., and the average figure obtained was £97 9s. p.ct.

Liquid Air, Ltd.—Presiding over the tenth annual general meeting of the Company, on the 10th ult., at Queen's Park Works, N.W., Mr. O. Simonis said the Company had made a profit of 26 p.ct., against the previous year's profit of 21 p.ct. Their progress in the last three years had been singularly rapid, and this at a time when the general engineering trade of the country had been in a bad state—more particularly the shipbuilding industry, which was one of the largest consumers of oxygen. When some three-and-a-half years ago they had reached the point of producing pure oxygen by means of relatively small production plants, they found an enormous field before them in this country. Some of the larger consumers of oxygen readily saw the savings they could effect by running their own production plants, and in several instances succeeded in recouping their capital expenditure within twelve months. A dividend of 12½ p.ct. for the year was declared, as against 10 p.ct. for the preceding twelve months.

Examination of Workers to Prevent Cancer.—In the course of an inquest at Manchester on the body of a pitch-getter who had been employed at Lord's Chemical Works, and died of cancer, the Coroner asked a doctor who was giving evidence whether, if some form of medical examination of persons working in tar was made obligatory upon employers, the disease might be detected in its early stages, and a cure be rendered possible. The doctor replied that this would be invaluable. The Coroner thereupon asked the Secretary of the Company whether, in view of this case, they were prepared to take steps to have such an examination. The Secretary said they were. A number of men had already been examined, and the Company were willing to have regular periodical examination of their employees, in the hope of stopping such cases.

Bombay Gas Company, Ltd.—The accounts for the year ended Dec. 31 last will be submitted at the meeting of shareholders to-morrow (Thursday). The revenue account shows a profit of £27,028, which added to the profit on exchange, £855, and the balance of £33,023 brought forward from the previous year amounts to £60,907. After providing for the payment of interest and interim dividend, and the addition of £1423 to the reserve fund, £949 to the renewal fund, and £172 to the insurance fund, there remains a balance of £46,251, out of which the Directors recommend the payment of a dividend of 4 p.ct. (less income-tax), making 8 p.ct. for the year, which will leave £35,051 to be carried forward. The trade depression in Bombay has continued throughout the year, and has temporarily affected the business of the Company. No trouble has been experienced with the Company's native workmen; but a general strike and lock-out is now in progress in the cotton mills.

GAS REGULATION ACT ORDER.

We have received from the Director of Gas Administration a copy of the following further Order made by the Board of Trade under section 1 of the Gas Regulation Act.

Poulton-le-Fylde Urban District Council.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 13d. per therm. (April 30.)

TRADE NOTES.

The Value of Trade Marks.

Messrs. Rayner & Co., of No. 5, Chancery Lane, W.C.1, have brought out a publication bearing the title "Unbranded," in which they point out the necessity for having a registered trade mark.

"Save the Machinery."

This is the title of a booklet which has been prepared by Messrs. Matthew Wells & Co., Ltd., of Manchester (London address, No. 317, High Holborn, W.C.1), describing their "Wellsaline" lubricants. The booklet is well illustrated and contains much useful information.

Messrs. R. & A. Main and British Furnaces.

Messrs. R. & A. Main, Ltd., have now become partners in British Furnaces, Ltd., and will be represented on that Board by Mr. Kenneth Aird and Mr. James Archd. Maclay. The constituent Companies of British Furnaces, Ltd., will now therefore be: Messrs. Woodall-Duckham (1920), Ltd., the Bryan-Donkin Company, Ltd., Messrs. W. C. Holmes & Co., Ltd., the Surface Combustion Company of New York, and Messrs. R. & A. Main, Ltd. The association of these varied interests in the gas industry is of mutual value and great strength to British Furnaces, Ltd., the objectives of this Company being to develop the application of gas to industry on sound lines. This combination ensures an economical organization and efficiency in execution.

CURRENT SALES OF GAS PRODUCTS.

Tar Products in the Provinces.

May 5.

The market for tar products has remained steady throughout the past week, and there is very little change.

The average values for gas-works products during last week were: Gas-works coal tar, 48s. 6d. to 53s. 6d. Pitch, East Coast, 55s. to 57s. 6d. f.o.b. West Coast—Manchester, 51s. 6d. to 52s. 6d; Liverpool, 52s. 6d. to 53s. 6d.; Clyde, 54s. to 55s. Benzole 90 p.ct., North, 1s. 5d. to 1s. 6d.; crude 65 p.ct. at 120° C., 1s. to 1s. 1d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 10d. Toluole, naked, North, 1s. 5d. to 1s. 6d., nominal. Coal tar crude naphtha in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 5d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, liquid, 7½d. to 7⅝d.; salty, 7½d. to 7⅝d.; Scotland, 7d. to 7½d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 2s. 1½d. to 2s. 4½d. prompt. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Suggested Joint Showroom for Warrington.—The Warrington Corporation have asked the Gas Manager, in conjunction with the Electrical Engineer, to report on a proposal to establish a joint showroom in a central position in the town.

Prepayment Meter Theft.—At Nantwich Police Court, Thos. W. Franklyn (19) was charged with stealing from a gas-meter 7s. 8d., the money of the Nantwich Urban Council. The prisoner had a bad record, and the Magistrates sent him to prison for three months, with hard labour.

Contribution to the Rates at Wolstanton.—The Gas Committee of the Wolstanton Urban Council reported to a meeting of the Council last week their resolve that a sum of £1000 be transferred to the general accounts for the reduction of the rates. The Chairman (Mr. W. J. Hassam) said that since the inception of the gas-works they had paid off something like £28,000 or £29,000 in loans. The Committee had fully discussed the question of making a contribution towards the relief of the rates, and in view of the necessity of spending a considerable sum on the repair of the roads, they had come to the conclusion mentioned. Such a course was against his principles, but in the circumstances he only wished that they had been able to transfer £2000. Mr. Ford, seconding the adoption of the report, paid a warm tribute to the technical knowledge of Mr. Hassam, and to the time he devoted to the work of the Gas Committee.

Prevention of Mining Accidents.—The proprietors of the "Colliery Guardian" offer two prizes of ten guineas and five guineas respectively for the best designs or suggestions having for their object the prevention of accidents from falls of ground in mines. Candidates must be *bonâ-fide* working miners or officials, up to and including the rank of deputy, and each entry must be accompanied by a statement as to the nature of employment at the date of entry, and the name and address of the candidate. All entries must reach the "Colliery Guardian" offices, Nos. 30 & 31, Furnival Street, Holborn, E.C., not later than July 1. In awarding the prizes, weight will be given to the originality, practicability, and general utility of the suggestion, and, other things being equal, to the clearness with which it is described. Preference will be given to proposals, additional to the requirements contained in the General Regulations, that are adaptable to practical working methods.

THE NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

The market has experienced the worst week it has had for a long time, and prices of all kinds of coal have come down day by day without bringing any new business. After gradually stocking up for some weeks before there was a possibility of a strike, buyers now appear to be entirely holding off. Collieries are facing up to the situation, and quite realize that they are probably going to have a very lean market or two. Some, especially in Northumberland, have already had "idle time." To-day (May 5) the pits generally are closed throughout the two counties in connection with "May Day" celebrations. The coal will not be missed. Any small orders which come on the market are being eagerly snapped up by collieries whose object, while the slump lasts, is to keep working as much as possible even at barely remunerative prices; idle days being a serious expense.

Good quality gas coal collieries are better placed than most, being, on the whole, well contracted. Best sorts could probably, however, be bought for shipment this or next month as low as 23s. Good coking unscreened is freely offered down to 21s.; but buyers on the Continent are coming back with counter-offers at 20s. or less.

Collieries are not quoting these low prices for business for the second half of the year, so that there is no trade at all passing beyond the end of June. The general market opinion is that the slump will last two or three months at the most.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

There is at the moment a general uncertainty in regard to the coal trade situation in Yorkshire and Lancashire. Possibly this is due to the normal decline in the demand for house coal and to the fact that the requests for industrial fuel have lately been proportionately fewer than formerly.

There does not appear to be a good inquiry for coal for export, which is explained by the increased prices which producers are charging and the high rates of exchange which have operated recently. It would seem, however, that there will be an alteration during the next few weeks, when distribution and the cost of production permit of a general trade to the nearer continent. The daily exports from Hull have dwindled from between 10,000 and 20,000 tons to below 2000 tons.

The gas coal market is rather weak, owing to the milder weather. Both producers and buyers are awaiting events in regard to advances in miners' wages, from which they will be able to ascertain their respective positions over the next twelve months. Contracts generally will be fixed from July 1; and it depends on the state of trade up to that date as to what figures will operate.

Nominal prices at Hull at the week-end were:—Bunkers: Yorkshire, Derby, and Notts large screened steam, f.o.b. Humber ports, 25s. to 25s. 6d. Cargo for export, f.o.b. usual shipping ports: Best Yorkshire hards, Association, 26s. 6d.; Derby best hards, 26s. 6d.; West Yorkshire Hartleys, 25s. to 27s. 6d.; South Yorkshire washed doubles, 27s.; ditto, washed singles, 27s.; dry doubles, 24s. 6d.; South Yorkshire washed smalls, 20s. 6d. to 21s.; Derby slack, 1 in., 17s. 6d.; South Yorkshire rough slack, 18s. 6d.; gas coke, 38s. 6d.; foundry furnace coke, 30s.; washed smithy peas, 27s. 6d. to 30s. 6d.; washed steam thirds, 24s. 9d.; South Yorkshire washed trebles, 27s. 6d. per ton.

The Lancashire market is considerably quieter, and although there has been no change in the colliery prices, the rather extravagant premiums on those prices are disappearing. Slacks are rather easier at 17s. to 18s. per ton, and unscreened industrial coal at about 23s. 6d. at the pits. Best Lancashire house coal is quoted at 34s. 6d. to 35s. 6d. per ton.

COAL TRADE IN THE MIDLANDS.

From our Local Correspondent.

Buying and selling are practically at a standstill. The business done during the past three weeks has been negligible. Until they know what their labour costs are to be collieries do not care to quote. Gas undertakings are covered up till midsummer. Those who took such opportunities as arose a little while ago, of making contracts beyond midsummer, are congratulating themselves that they acted wisely in closing with the terms offered, which were not much in advance of the contract prices settled last midsummer.

Since the holidays collieries that are in arrears with their deliveries have been making up for lost time. With the lengthening days and the relief of traffic at previously congested points transport has been working better, so that gas engineers have not been driven to make emergency purchases. The small amount of business passing affords no real test of prices. Everything hinges on the Buckmaster report and the decisions consequent thereon. The market for industrial and household fuel is as inert as other departments. Producers of iron and steel are endeavouring to get higher prices in view of the appreciation of costs which has already resulted from the difficulties of the coal outlook, but buyers are unresponsive. Furnace coke can only be obtained by paying substantially more than the contract rates. Gas coke remains scarce and dear.

Glasgow and Mearns Gas Supply.—In regard to the gas supply required for the Mearnskirk Sanatorium, it is proposed to arrange a provisional agreement for the transfer to the Glasgow Corporation of the gas works, plant, mains, and meters belonging to the Mearns Gas Company. It is recommended that it be remitted to the Parliamentary Bills Committee to include on the next Provisional Order to be promoted by the Corporation provisions for an extension of the area of supply of the Corporation, so as to include the village of Mearns, the estate of Southfields, and immediate and adjacent territory.

STOCK MARKET REPORT.

The nervousness that was in evidence on the Stock Exchange lest the Budget would contain proposals hostile to capitalists disappeared on the Chancellor's lucid exposition of the national finances on Monday of last week. The definite statement of the Government's adherence to the sound principle of a steady reduction in the National Debt created a very good impression. Excepting the proposal to scrap the McKenna duties, the changes in taxation have been generally approved.

On Tuesday, although business still remained on the small side, markets were buoyant, and there seemed a likelihood of more general activity in the immediate future. The gilt-edged market was firm. War Loan was quoted *ex* dividend on Monday, and there was little change on the week. Conversion and Funding Loans improved steadily. By the time this article appears, a new £5,000,000 New Zealand issue is to be underwritten, which will take the form of a 4½ p.c. Loan at 95. Home Rails were more active, and in the Foreign Market Japanese and Siamese loans were in demand, closing at about 4⅜ premium in each case.

The feature of the Industrial Market was the steady decline in Motor shares, especially of those companies engaged in the manufacture of small cheap cars.

There was a fair amount of business done in Gas stocks, in spite of the May Day Holiday. Gas Light and Coke ordinary was in demand, and Imperial Continental made a further advance of 6 points. The latter stock has risen 22 points in the past month.

The following transactions were recorded during the week: On Monday, Bournemouth "B" 12⅜, 6 p.c. preference 11¾, 11⅞, Brighton and Hove original 171, Bristol 90, 90¼, Commercial 3½ p.c.t. 91, European 7 1/16, Gas Light and Coke 91½, 91⅝, 91¾, 92, 92⅛, 92¼, 92⅛, 4 p.c. preference 79½, 3 p.c. debenture 60, Hastings and St. Leonards 5 p.c.t. 93, Hong Kong and China 16⅞, Imperial Continental 159, Primitiva 8s. 6d., 5 p.c.t. preference 33s., 33s. 6d., South Metropolitan 97½, 98⅛, 3 p.c.t. debenture 59⅛, South Suburban 5 p.c.t. 98½, Wandsworth Epsom Stock 115½. Supplementary prices, Barnet "D" Water stock 110, Southend-on-Sea 5 p.c.t. "B" 89, 89½. On Tuesday, European 6⅞, 7, Gas Light and Coke 91½, 91⅝, 91¾, 92, 92¼, 3½ p.c.t. maximum 62, Hastings and St. Leonards 5 p.c.t. 91⅜, 92, 92½, 3½ p.c.t. 77½, 78, Imperial Continental 157, 158, 159, 155½, 160, 160 11/16, South African 7⅜, South Metropolitan 97⅜, 98⅛, Tottenham "B" 99½, 99⅜. Supplementary prices, Barnet "B" 132½. On Wednesday, Alliance and Dublin 66⅛, 66⅜, Bombay 5⅜, Bournemouth 6 p.c.t. preference 11⅞, Brentford "A" 100, "B" 97, British 118, Commercial 4 p.c.t. 92, Gas Light and Coke 91½, 91⅜, 92¼, Hastings and St. Leonards 5 p.c.t. 92½, 92½, 3½ p.c.t. 78, Imperial Continental 160½, 160½, 161, Montevideo 55½, Oriental 102, South Suburban 5 p.c.t. 99½, Tottenham "B" 99, 100, Wandsworth Epsom stock 118½. Supplementary prices, Barnet "D" Water stock 110, Danish 4 p.c.t. debenture 80, Lea Bridge 7 p.c.t. debenture 103, Rochester, Chatham 79½. On Friday, Alliance and Dublin 66, Bombay 5⅛, Bournemouth "B" 12⅜, British 117½, 118, Commercial 4 p.c.t. 92½, European 6⅞, 7 1/16, Gas Light and Coke 91⅜, 91⅝, 92, 92¼, 92½, 3½ p.c.t. maximum 63, 4 p.c.t. preference 81, Imperial Continental 159½, 160, 160¼, 160¾, 161, 162, 162½, 3½ p.c.t. debenture 70, Primitiva 5 p.c.t. preference 33s. 6d., South Metropolitan 97½, 98, 98½, 98¾, Tottenham "B" 99½, 99⅝. Supplementary prices, British, Norwich, 3 p.c.t. debentures 54, Eastbourne 3½ p.c.t. "B" 103, Lea Bridge 7 p.c.t. debenture 105, Rochester, Chatham, and Gillingham 80.

The Short Loan Market was decidedly easier after Thursday's dividend payments, and balances were offered in Lombard Street at 1 p.c. Old day-to-day loans were renewed at 2¼ p.c.; but the bulk of the business was on a 2 p.c. basis. The average rate at which Treasury Bills were allotted, £2 18s. 11·3d., had a steadying effect, a lower rate having been generally expected.

The feature of the Foreign Exchange Market was the strength of the dollar-sterling, which closed on Friday at 4.38⅝. On Jan. 24 the rate stood at 4.20, since which date there has been a steady improvement. French and Belgian francs are now more stable, and there was very little change on the week, the closing value being 67.82½ and 80⅝ respectively. Italian lire remained steady at 97 13/16.

Some fairly heavy Easter selling caused a decline in the price of Silver to 32 13/16d. on Wednesday, but closed on Friday at 33d. per oz. on Continental buying.

The Bank rate is 4 p.c., to which it was raised from 3 p.c. on July 5. Bankers' deposit rates are 2 p.c. The deposit rates of the discount houses are 2 p.c. at call and 2½ p.c. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. May 2.	Rise + or Fall − on Week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
131,978	Stk.	Feb. 7	5	5	Aldershot 5 p.c. max. C. .	73—78	+3	..
235,492	,,	,,	4	4	Do. 4 p.c. Pref. . .	68—73	..	..
1,551,868	,,	Apr. 3	5½	6	Alliance & Dublin Ord. .	64—69	..	66—66⅛
374,000	,,	Jan. 10	4	4	Do. 4 p.c. Deb. . .	60—65	..	..
280,000	5	Oct. 18	8	8	Bombay, Ltd.	5—5⅛	..	5⅛—5⅜
100,000	10	Mar. 6	8½	8½	Bournemouth 5 p.c. . .	12⅛—13½	..	..
383,110	10	,,	7	7	Do. B 7 p.c.. .	11⅛—12⅜	+⅛	12½—12⅜
115,000	10	,,	6	6	Do. Pref. 6 p.c..	11—12	..	11⅛—11⅜
50,000	Stk.	Dec. 28	3	3	Do. 3 p.c. Deb..	55—60	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb..	75—80	..	..
992,045	,,	Feb. 21	6 3/10	6 3/10	Brentford A Con. . . .	96—101	..	100
990,500	,,	,,	6½	6½	Do. B New . . .	96—101	..	97
76,000	,,	,,	5	5	Do. 5 p.c. Pref. . .	89—94	..	..
306,690	,,	Dec. 13	4	4	Do. 4 p.c. Deb. . .	76—81	..	..
181,337	,,	—	—	—	Do. 6 p.c. Rich. Red. Deb.	99—101	..	..
214,740	,,	Mar. 6	11½	11½	Brighton & Hove Orig. .	170—175	..	171
244,200	,,	,,	8½	8½	Do. A Ord. .	124—127	..	..
1,287,500	,,	Feb. 21	5	5	Bristol 5 p.c. max. . . .	90—91a	..	90—90½
855,000	,,	Mar. 20	—	7	British Ord.	117—122	..	117½—118
100,000	,,	—	7	7	Do. 7 p.c. Pref.. . .	120—125	..	..
120,000	,,	Dec. 28	4	4	Do. 4 p.c. Red. Deb. .	73—78	..	..
100,000	10	,,	7	6	Cape Town, Ltd. . . .	6½—7½	..	..
100,000	10	Apr. 24	4½	4½	Do. 4½ p.c. Pref.. .	6—7*	..	..
150,000	Stk.	Dec. 28	4½	4½	Do. 4½ p.c. Deb.. .	73—78	..	..
626,860	,,	Feb. 21	6	6	Cardiff Con. Ord. . . .	97—99	..	..
237,860	,,	Dec. 28	7½	7½	Do. 7½ p.c. Red. Deb. .	105—110	..	..
157,150	,,	Mar. 6	5	6½	Chester 5 p.c. Ord. . . .	85—90b	..	..
1,513,280	,,	,,	6	6	Commercial 4 p.c. Cap. .	90—95	..	92—92½
560,000	,,	,,	6	6	Do. 3½ p.c. Cap. .	90—95	..	91
475,000	,,	Dec. 13	3	3	Do. 3 p.c. Deb. .	57—60	..	..
800,000	,,	14 Jan. 15	—	—	Continental Union, Ltd. .	28—33	..	..
200,000	,,	Dec. 13	7	7	Do. 7 p.c. Pref. . .	75—80	..	..
660,000	,,	Mar. 6	6½	6½	Croydon sliding scale .	101—104	..	..
284,975	,,	,,	5	5	Do. max. div. . . .	83—86	..	..
192,270	,,	Feb. 21	3	4½	Derby Con.	108—110c	..	..
55,000	,,	Jan. 12	4	4	Do. Deb.	74—76c	..	..
209,000	,,	Apr. 3	5	5	East Hull 5 p.c. max. . .	..	..	..
1,002,180	10	Jan. 24	5	2	European, Ltd.	6⅞—7⅛	..	6⅞—7 1/16
16,503,045	Stk.	Feb. 7	5⅛	5⅛	Gas Light & Coke 4 p.c. Ord.	91—93	..	91⅛—92⅛
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max. .	60—63	..	62—63
4,062,235	,,	,,	4	4	Do. 4 p.c. Con. Pref.	78—81	..	79½—81
4,761,930	,,	Dec. 13	3	3	Do. 3 p.c. Con. Deb.	58—61	..	60
130,000	,,	Dec. 11	10	10	Do. 10 p.c. Bonds .	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 20	6½	6½	Hastings & St. L. 5 p.c. Conv.	91—96	..	91⅛—93
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	77½—78
70,000	10	Oct. 18	10	10	Hongkong & China, Ltd. .	16—17	..	16½
86,600	Stk.	Mar. 6	9½	10	Hornsey 7 p.c.	143—148	..	..
1,976,000	,,	Nov. 15	17	5	Imperial Continental Cap..	160—165	+6	157—162½
401,400	,,	Feb. 7	3½	3½	Do. 3½ p.c. Red. Deb.	69—72	...	70
235,242	,,	Mar. 6	6½	6½	Lea Bridge 5 p.c. Ord.. .	92—97	..	..
2,127,340	,,	Feb. 21	5½	5½	Liverpool 5 p.c. Ord. . .	90⅛—91⅛b	+1	91⅛
600,000	,,	Mar. 20	7	7	Do. 7 p.c. Red. Pref.	103—106b	..	..
165,736	,,	Feb. 21	9	8	Maidstone 5 p.c. Cap. . .	124—129	..	..
63,480	,,	Dec. 28	3	3	Do. 3 p.c. Deb. . .	54—59	..	..
75,000	5	Dec. 13	7	5	Malta & Mediterranean .	3⅜—3½	..	..
50,000	100	Apr. 1	4½	4½	Met. of Melb'rne 4½ p.c. Deb.	93—96	..	..
541,920	Stk.	Nov. 29	4	4	Montevideo, Ltd. . . .	54—59	..	55½
1,875,892	,,	Mar. 6	4⅞	5⅛	Newcastle & Gateshead Con.	83—84d	..	..
250,166	,,	,,	4	4	Do. 4 p.c. Pref..	73—75d	..	..
529,705	,,	Dec. 28	3½	3½	Do. 3½ p.c. Deb.	71—73d	..	..
15,000	10	Mar. 6	11	11	North Middlesex 10 p.c. .	16—17	..	..
75,940	10	,,	7 7/10	7 7/10	Do. 7 p.c. .	11½—11⅞	..	..
300,000	Stk.	Nov. 29	7	9	Oriental, Ltd.	98—103	..	102
138,120	,,	Dec. 28	7⅞	7⅞	Plym'th & Ston'house 5 p.c.	107—112	..	..
60,000	50	Mar. 6	13	13	Portsea Island B . . .	102—105	..	..
100,000	50	,,	12	12	Do. C . . .	98—103	..	..
1,450,345	5	29 Oct. 14	—	—	Primitiva Ord.	⅜—½	..	8/6
2,499,800	5	30 Dec. 15	—	—	Do. 5 p.c. Pref. . . .	1 1/16—1 1/16	−1/16	33/—33/6
341,400	100	Dec. 3	4	4	Do. 4 p.c. Red. Deb.. .	70—75	..	..
600,000	Stk.	Jan. 24	4	4	Do. 4 p.c. Red. Deb. 1911	54—57	..	..
220,335	,,	Dec. 28	4	4	Do. B. Aires 4 p.c. Rd. Db.	55—58	..	..
321,670	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	55—58	..	..
150,000	10	Oct. 4	6	6	San Paulo 6 p.c. Pref. . .	5⅛—6	..	..
125,000	50	Jan. 2	5	5	Do. 5 p.c. Red. Deb.	39—41	..	..
270,000	Stk.	Mar. 20	5	5/8/4	Sheffield A	101—103e	+1	..
419,968	,,	,,	5	5/8/4	Do. B	101—103e	+1	..
1,047,000	,,	,,	5	5/8/4	Do. C	101—103e	+1	102
90,000	10	Oct. 18	9	6	South African	7—9	..	7⅛
6,609,895	Stk.	Feb 21	5	6½	South Met. Ord.	97½—99½	+1	97½—98½
102,580	,,	Jan. 10	5	5	Do. Red. Pref. . .	98—100	..	..
1,895,445	,,	,,	3	3	Do. 3 p.c. Deb. . .	57—60	..	59½
734,000	,,	Mar. 6	6½	6½	Do. 6½ p.c. Red. Deb.	103—105	..	105
91,500	,,	Aug. 23	8½	8½	South Shields Con. . . .	136—138d	..	..
1,087,795	,,	Feb. 21	6	6½	South Suburban Ord. 5 p.c.	98—101	+1	98¼—99½
368,837	,,	Dec. 28	5	5	Do. 5 p.c. Deb.	95—100	..	..
647,740	,,	Nov. 15	7	6	South'mpt'n Ord. 5 p.c. max.	86—89	..	..
121,275	,,	Dec. 28	4	4	Do. 4 p.c. Deb.	74—79	..	..
250,000	,,	Mar. 6	7	7	Swansea 7 p.c. Red. Pref. .	102—104	..	..
200,000	,,	Dec. 28	6½	6½	Do. 6½ p.c. Red. Deb. .	102—104	..	..
120,000	,,	Feb. 21	8	8	Tottenham District A 5 p.c.	119—124	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	98—103	..	99—100
181,255	,,	Dec. 13	4	4	Do. 4 p.c. Deb.	77—81	..	..
258,251	,,	Mar. 20	5	7/14/4	Tynemouth Con. and New	84—86d	..	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Mar. 6	9	9½	Wandsworth A 5 p.c. .	132—137	..	..
255,636	,,	,,	7½	7½	Do. B 3½ p.c. .	110—115	..	..
108,075	,,	,,	6 5/16	6/7/9	Do. C . . .	96—101	..	..
240,865	,,	,,	6 5/16	6/7/9	New Ordinary.	..	..	..
352,000	,,	,,	7½	7½	Wimbledon 5 p.c. . .	108—113	..	..
98,000	,,	,,	7⅜	7½	Epsom 5 p.c.. . . .	112—117	..	115½—118½
88,416	,,	Dec. 28	3	3	3 p.c. Deb.	56—61	..	..

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. * Ex. div.

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By

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The Darlington Corporation have received sanction to borrow £6648 for the reconstruction of a gasholder.

At a meeting of the Darwen Corporation Committee last week, it was reported that the profits of the year in the Gas Department amounted to £3002.

Owing to the growth of their business in the Manchester area, Messrs. Reavell & Co., Ltd., manufacturers of turbo compressors and exhausters, of Ipswich, have opened an office, as from May 1, at 49 & 50, Imperial Buildings, Oxford Street. This will be in charge of Mr. S. N. Howe.

The Gas Department of the Swadlincote Urban District Council have made a further reduction of 2d. per therm (9d. per 1000 c.ft.) in the price of gas within the district, and of 2½d. per therm (11½d. per 1000 c.ft.) outside the district.

The Cork Gas Consumers' Company have decided on a course of practical lectures on, and demonstrations in, gas cooking. The first of these, held at the Showroom, South Mall, attracted a good audience, and an extension of the use of gas-cookers—already very popular in the Cork district—is hoped for as a result of the instruction given.

On receipt of an offer from a London firm to take a 50 years' lease of the Corporation's gas undertaking, subject to the Board of Trade and Electricity Commission's approval, the Ripon City Council have asked for the following detailed information: The basis on which they would arrange a lease rental, particulars of other public authorities who have leased undertakings of a similar character, the basis for regulation of prices (gas and electricity), the limit of capital expenditure, the annual financial liability, the proportion of local directors and by whom appointed, the minimum profit to be earned, and the draft agreement.

An auction sale by Messrs. West, Usher, and Co., at Deal, last Wednesday, included gas stock, which was put up in lots of £100 each. A total of £2778 of capital stock in the Deal and Walmer Gas and Electricity Company (the last dividend on which was at the rate of 7 p.ct. per annum) was disposed of at an average price of £103 8s. per £100 of stock; while £420 of ordinary stock in the Folkestone Gas and Coke Company (the last dividend on which was at the rate of 5 p.ct. per annum) realized an average of £89 12s. 10d. per £100 of stock. The bidding was spirited and well maintained. Prices for the Deal stock ranged between £102 and £105 10s., and for the Folkestone stock between £88 and £95 per £100.

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"FALCON" INVERTED LAMPS,
SQUARE STREET LANTERNS,
SUPERHEATER BURNERS, and
CONVERSION SETS for Street Lanterns.

APPOINTMENTS, &c., VACANT.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualifications being equal, has the FIRST CALL ON YOUR CONSIDERATION.

WORKS Manager Wanted for Gas Company on the South Coast making about 88 Millions per annum. Knowledge of Electrically-driven Charging Machines essential. Salary to competent man, £310 per Annum, and House on Works provided.
Apply, stating Age and Qualifications, with *copies* of Testimonials, to No. 7418, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

WANTED—for an English Colonial Gas-Works, a Gentleman as ASSISTANT ENGINEER, Age about 30/35, capable of Taking ENTIRE CHARGE when necessary of a works making about 170/180 millions per annum. Must be a Hard Worker, of Practical Experience, able to apply his Practical Knowledge, to Undertake Outside Work as required, and be Energetic in introducing New Business. Salary, exclusive of Bonus, about £500 per Annum, with free use of Rooms in Residence on the Company's Works.
Apply No. 7413, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

WANTED—for an English Colonial Gas-Works making about 170/180 Millions, a WORKS FOREMAN. Age about 30/35. Must be a Hard Worker and able to Superintend Native Labour, also must have had thorough Experience in the working of West's Verticals. Salary £350, with Free Rooms on Works or House Allowance.
Apply No. 7414, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

WANTED—for an English Colonial Gas-Works an ASSISTANT to the BRITISH FITTING SUPERINTENDENT. Age about 25. Must be a Hard Worker. Experienced in up-to-date Fitting Work, Mainlaying, Meters, &c., and able to Superintend Native Labour. Wages £300, with Free Rooms on Works or House Allowance.
Apply No. 7415, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

WANTED, by Well-known Firm of GAS METER MAKERS, a SENIOR REPRESENTATIVE having Good Connection in North of England.
Apply, with Full Particulars, to No. 7411, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

PLANT, &c., FOR SALE & WANTED.

GAS PLANT IN STOCK.

GASHOLDERS.—Various Capacities in Stock up to 500,000 c.ft. Low Prices for erection complete, with STEEL TANKS.
Condensers.—Annulars: Sets of 3 and 4, 12 in. Connections. Water Tube Condensers (½ million), 14 in. Conns., 6 in. and 8 in. Pipe Condensers.
Tower Scrubbers.—5 by 40, 5 by 30, 5 by 20, 4½ by 36, 4 by 24, 4½ by 18, Cast and Wrought Iron.
Purifiers.—Sets 25 ft. sq., 20 ft. sq., 10 ft. sq.
Exhausters.—Steam and Belt driven, 2000 to 50,000 c.ft. capacity.
Station Meters.—3000, 5000, 10,000, 15,000, up to 60,000 c.ft. capacity. New Drums.
Also a good stock of WASHERS, TAR EXTRACTORS, TANKS, PUMPS, ENGINES, VALVES, &c. Detailed List on Application. Really First-Class Gas Plant, equal to new.
Bargain prices for erection complete.
Firth Blakeley, Sons, & Co., Ltd.,
CHURCH-FENTON, *via* LEEDS.

STEAM-BOILERS For Sale—All Sizes, Vertical, Loco-type, Cornish, Portable, and Other Types of Boilers.
Apply GRANTHAM BOILER & CRANE CO., LTD., GRANTHAM.

FOR SALE—One Excellent Two-Lift SPIRAL GASHOLDER, by Cutler, London. 125,000 cubic feet capacity. Done very little work. First-Class Order. Fifty Tons of 12 in. diameter CAST-IRON SPIGOT AND SOCKET PIPES, various lengths, including Valves and Specials; also Large Quantity of other GAS PLANT SPARES. Inspection Invited. Cheap for Prompt Sale.
JONAS WILDSMITH, Queen's Road, BARNSLEY.

FOR SALE—Complete Set of the "GAS JOURNAL," Volumes 1 to 123 inclusive, bound in Leather. What Offers?
Address No. 7419, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

CITY AND ROYAL BURGH OF DUNFERMLINE.
(GAS DEPARTMENT.)

THE Gas Committee of the above Corporation offer the following PLANT FOR SALE:
1.—Four PURIFIERS, 22 feet square by 5 feet deep inside, complete with Centre Valve, Connections, and Hydraulic Lifting Gear.
2.—TOWER SCRUBBER, 8 feet dia. by 40 feet high, together with Inlet and Outlet Valves.
These have been replaced by plant of greater capacity.
Full Particulars will be supplied on Application to the undersigned.
JAMES CAMPBELL,
Engineer and Manager.
Gas Works,
Dunfermline,
May 5, 1924.

FOR SALE—A 2-Cylinder Gas-Engine of 250 H.P., made by the National Gas-Engine Company, Ltd.; in Good Condition. Can be inspected by Appointment either Standing or under Working Conditions.
Apply THE TUNNEL PORTLAND CEMENT COMPANY, LTD., WEST THURROCK, ESSEX.

FOR SALE—Cockey Washer, 10 in. Outlet, with four 10 in. fourway valve and seal pot, six chambers. Can be seen working.
Apply, No. 7417, "GAS JOURNAL," 11, BOLT COURT FLEET STREET, E.C. 4.

TANK WAGONS.

WANTED to Hire at once for a minimum period of Three Months, 14 or 20 Ton Railway Tank Wagons suitable for Main Line Conveyance of Tar.
Full Particulars and Hire Terms to the NEWCASTLE AND GATESHEAD GAS COMPANY, 33, GRAINGER STREET WEST, NEWCASTLE-ON-TYNE.

WANTED—Sulphate of Ammonia PLANT, in Good Working Condition. Daily production, half ton or ton.
State Price, Particulars, and where seen, to the undersigned.
PETER M. SIM,
Manager.
Gas-Works,
Buckie, N.B.

WANTED Second Hand Livesey Washer, 14 in. connections, 750,000 c.ft. daily capacity. Must be in good condition.
Apply, No. 7416, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

CONTRACTS OPEN.

BRIDGNORTH CORPORATION.
(GAS WORKS.)
TO COLLIERY PROPRIETORS & OTHERS.

THE Gas Committee are prepared to receive SEALED TENDERS for the Supply of SCREENED GAS COAL, or WASHED GAS NUTS, including carriage to the Bridgnorth Railway Station, for One Year from, or soon after, the end of June, 1924.
Evidence as to quality of Coal must accompany each Tender.
The Coal or Nuts must be well Screened or Washed, free from Bats, Binds, or other Refuse, and be freshly got at the time for Delivery.
Quantity required: About 3000 Tons in proportionate deliveries as directed—say, 70 per cent. during Winter Months, and 30 per cent. during Summer Months.
Sealed and marked Tenders must be sent to the undersigned not later than Saturday, the 17th inst.
The Committee reserve to themselves the right to divide the quantity into two or more Contracts, and do not bind themselves to accept the lowest or any Tender.
Official Forms for Tender are not furnished.
By Order,
J. H. COOKSEY,
Town Clerk, Secretary.
Bridgnorth.
May 2, 1924.

MANCHESTER CORPORATION.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Supply of 36-inch WELDED STEEL PIPES and SPECIALS, to be Delivered at their Gaythorn Works and on route.
Specification, Drawing, and Form of Tender may be had on Application to Mr. J. H. Sillitoe, Secretary, Gas Department, Town Hall, Manchester.
Any further information required may be obtained on Application to Mr. Wm. Newbigging, at his Office, 5, Norfolk Street, Manchester.
Sealed Tenders, endorsed "Lap Welded Steel Mains," to be Delivered at the Gas Office, Town Hall, Manchester, not later than 5 p.m. on Thursday, May 15, 1924.
The Gas Committee do not bind themselves to accept the lowest or any Tender.
By order,
P. M. HEATH,
Town Clerk.
Town Hall,
Manchester,
May, 1924.